

Nutrient Management Plan

Willway Dairy Farm

*Prepared by Dennis J Godar
Date Prepared: 1/5/2012*



For Years; 2012-2016

Operation Name: **Willway Dairy Farm**
Owner / Operator's Name: **Will Maloney**
Farm Address: **5290 Holt Road
Sweetwater, TN 37874**
Operation Telephone Number: **(423) 351-4214
(423)836-8636**

Conservation Planner

As a Nutrient Management Technical Service Provider, I certify that I have reviewed this *Nutrient Management Plan* for technical adequacy and that the nutrient management plan is technically sound and reasonable and can be implemented.

Signature: _____ Date: _____

Name: Dennis J. Godar

Title: TSP/ CPAg

Certification Credentials: TSP #03-2005

Owner/Operator

As the owner/operator of this CNMP, I, as the decision maker, have been involved in the planning process and agree that the items/practices listed in each element of the CNMP are needed. I understand that I am responsible for keeping all the necessary records associated with the implementation of this CNMP. It is my intention to implement/accomplish this CNMP in a timely manner as described in the plan.

Signature: _____ Date: _____

Name:

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Section 1. Background and Site Information

Purpose of the Nutrient Management Plan (NMP)

The Nutrient Management Plan (NMP) is designed to address the soil erosion and water quality concerns on your operation and utilization of manure in a sound agronomic manner that will not cause nutrient losses to groundwater and surface water resources.

Manure and Nutrient Management is managing the source, rate, form, timing, placement and utilization of manure, other organic by-products, bio-solids, and other nutrients in the soil and residues. The goal is to effectively and efficiently use the nutrient resources to adequately supply soils and plants to produce food, forage, fiber, and cover while minimizing the transport of nutrients to ground and surface water and environmental degradation.

Nitrogen and Phosphorus vs. Water Quality

Nitrogen and Phosphorus are two nutrients that have the potential to impair the quality of our groundwater and surface water. Nitrogen leaching out the root zone may enter a tile and be transported to surface water or it may leach to the groundwater. The EPA Drinking Water Maximum Contaminant Level (MCL) for Nitrates is 10 mg/L. Phosphorus runoff entering the surface water may contribute to excessive algae growth which may cause low oxygen levels in surface water. This in turn may impair aquatic life. This manure and nutrient management plan will help to protect the groundwater and surface water.

1.1. General Description of Operation

Willway Dairy Farm is a dairy operation with approximately 300 milking cows and up to 50 head of calves confined, along with dry cows, growing stock and heifers that are not confined and raised on rotational pastures. The operation is leased and operated by the Will Maloney.

Approximately 247 acres of spreadable cropland and hayfields are included in this CNMP.

The farm fields are located in a rural area on the border of Loudon and Monroe Counties with rolling land between Galyon Ridge and Watson Ridge. The fields are drained to the south east directly into the Cherry Branch and Greasy Branch which enter into Pond Creek approximately 1.75 miles east of the facilities. Land use in the area is mostly cropland, pastures and hayfields. Land features include: ponds, grass waterways and riparian buffer strips that border the creeks. A fee fishing lake is nearby and borders several of the application fields. Grass buffer strips that are properly maintained help reduce impacts of soil erosion and nutrient runoff from fields. Grass buffer strips and riparian buffers also provide good wildlife habitat along the streams.

There are between 30 & 40 non-farm residences located within 1 mile of the facilities. General topography of the area is 0-30 % with the majority 2 -12%.

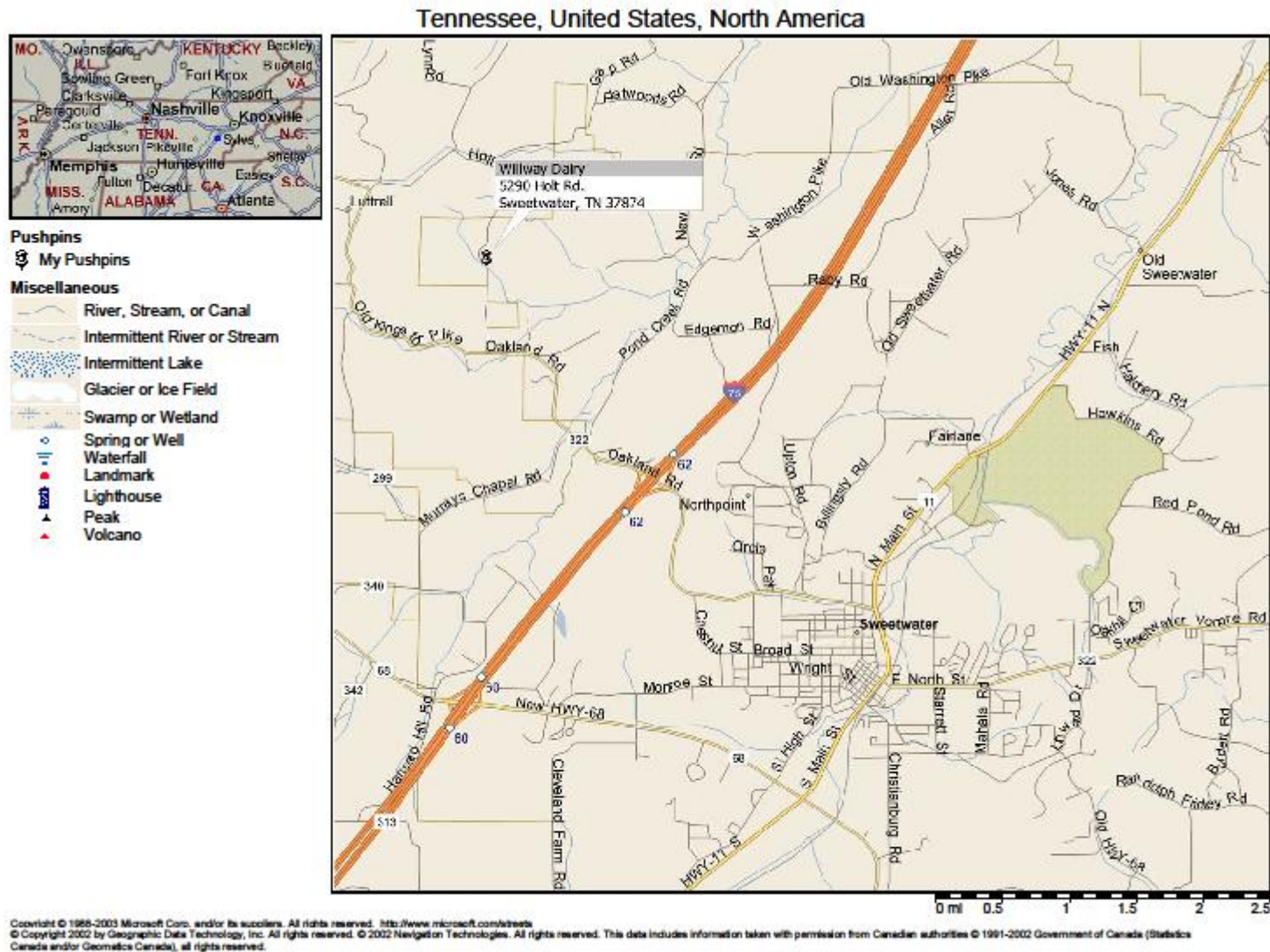
The fields and the facilities for the operation are located in the Pond Creek sub-watershed, (12-digit HUC: 060102010303) and the Tennessee River-10-digit watershed, (0601020103). This area is part of the 8-digit HUC: 06010201 Sub-basin known as the Watts Bar Lake Watershed.

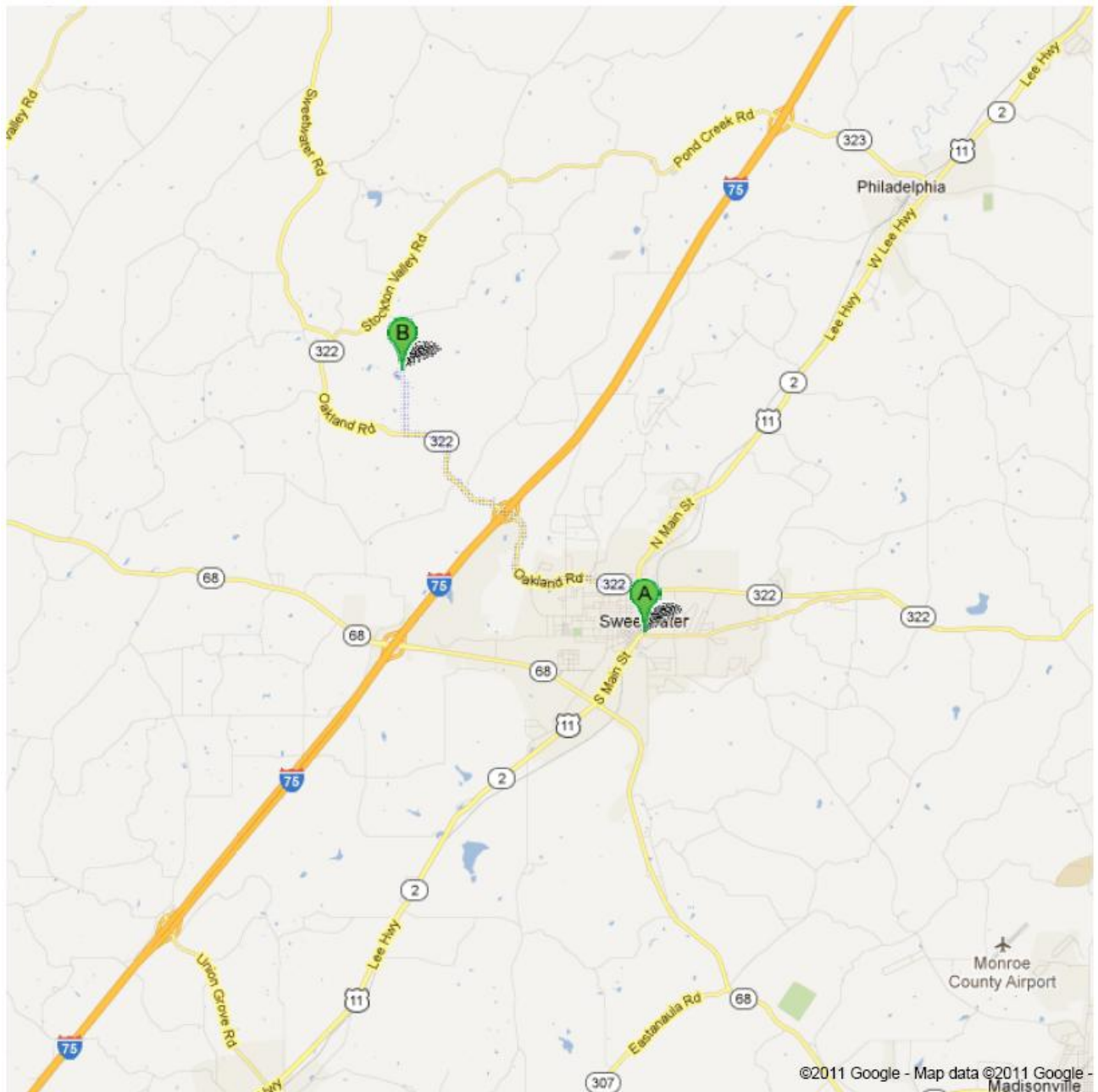
(See watershed reports at the end of this section).

1.2. Sampling, Calibration and Other Statements

- Manure sampling frequency: All solid and liquid manure from the lagoons will be sampled and analyzed annually. Use best management procedures for sampling found in manure testing references in Section 6.
- Soil testing frequency: Soil testing should be done a minimum of every four years, or sooner. Soil testing is an important tool especially for organic farming methods which manage soil fertility with proper use of manure and with crop rotations and plant diversity. Use best management procedures for sampling found in soil testing references in Section 6.
- Equipment calibration should be accomplished annually and whenever changing rates. For surface applied solids, use of the 'tarp' method also is a check on uniformity of applications. For irrigation of liquid manure, buckets placed in the field can help measure uniformity and also catch as applied samples. Use best management procedures for manure application equipment found in Section 2.
- Measures to prevent direct contact of animals with water: Dairy cows, when housed inside of barns will have no contact with water resources. Grazing animals should be restricted from having free access to streams. Improved stream crossings should be maintained and exclusion fences are recommended in sensitive areas.
- Silage is stored off-site in bunk silos on a separate operation. Silage leachate from the bunk silos is managed by draining from the cement floors to a grass filter strip. This area need to be maintained so that channelized flow does not occur. Filter strips should be fenced to exclude livestock and vegetation managed for best performance. Vegetation should be cut for hay to remove nutrients or could be flash-grazed if conditions allow without damage to the vegetation.

Location & Driving Directions:





Sweetwater, TN

1. Head **northeast** on **N Main St** toward **Biggs St**

go 0.5 mi
total 0.5 mi



2. Take the 3rd left onto **TN-322 W/Oakland Rd**
About 5 mins

go 2.9 mi
total 3.4 mi



3. Keep right at the fork
About 2 mins

go 1.4 mi
total 4.8 mi



4. Turn right onto **Holt Rd/Kingston Rd**
Continue to follow Holt Rd
Destination will be on the left
About 2 mins

go 0.8 mi
total 5.7 mi



5290 Holt Rd, Sweetwater, TN 37874

Clean Water Diversions

Clean water is being diverted away from possible contamination with manure or feed. All contaminated water will be collected and placed into one of the waste storage ponds, hauled directly to the field or diverted into filter strips that have been installed to absorb excess nutrients.

Animal Contact with surface water

Fences have been constructed to minimize any contact by the livestock with surface water. Where ponds may be utilized as a source of water for livestock, access will be limited.

Manure Transfer - Spillage

All areas of manure transfer shall be maintained to immediately clean up any spillage. If necessary and practicable, treatment options such as concrete pads, curbs, and bump walls shall be installed adjacent to manure storage and load-out areas to facilitate proper cleanup.

Manure Transfer – Road

Manure transport units will be maintained in good condition. Manure will not be allowed to spill on roadways, or other unauthorized areas. Sealed truck bodies, canvas covers, wetting down dry material and not overloading spreaders are some of the methods that can be used to prevent spilling. Additionally, cleaning of the transport and application units will be done in a manner that does not allow nutrient loading that would be detrimental to soil, air, plant, water or animal resources.

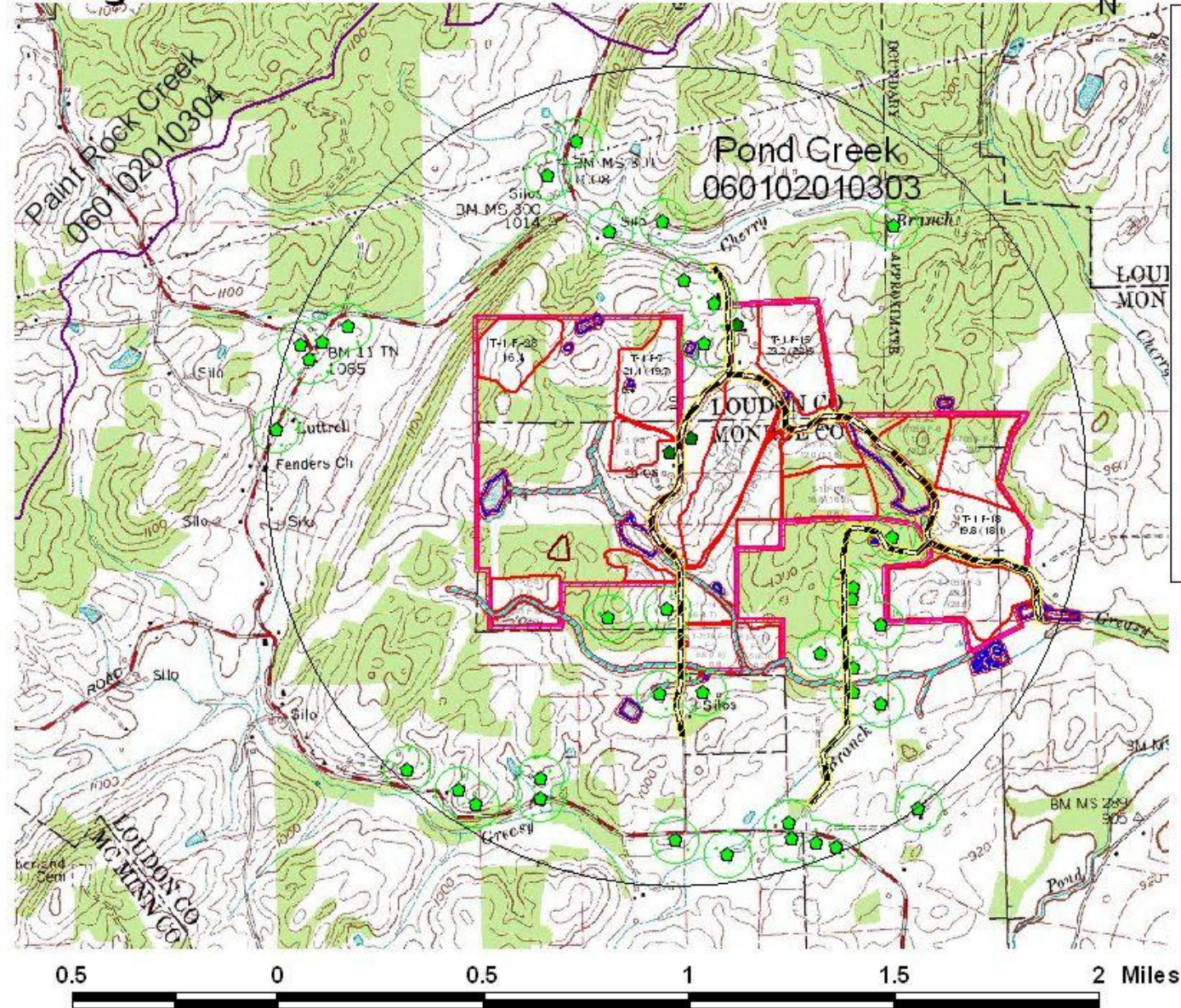
Closure Plan

If livestock production ceases at this location, the facilities shall be cleaned up to insure all remaining nutrient sources are removed. Closure will meet or exceed all USDA-NRCS practice standards applicable to closing a waste storage facility, including "Closure of Waste Impoundments (360)". All manure and nutrients and waste water shall be removed and applied to available cropland following agronomic rates following USDA-NRCS nutrient management and waste utilization standards and specifications.

See Dairy Facility Closure Plan at end of this section.

Waste Storage closure plan is included in Section 2, page 17.

Watershed Map 12 digit-HUCs



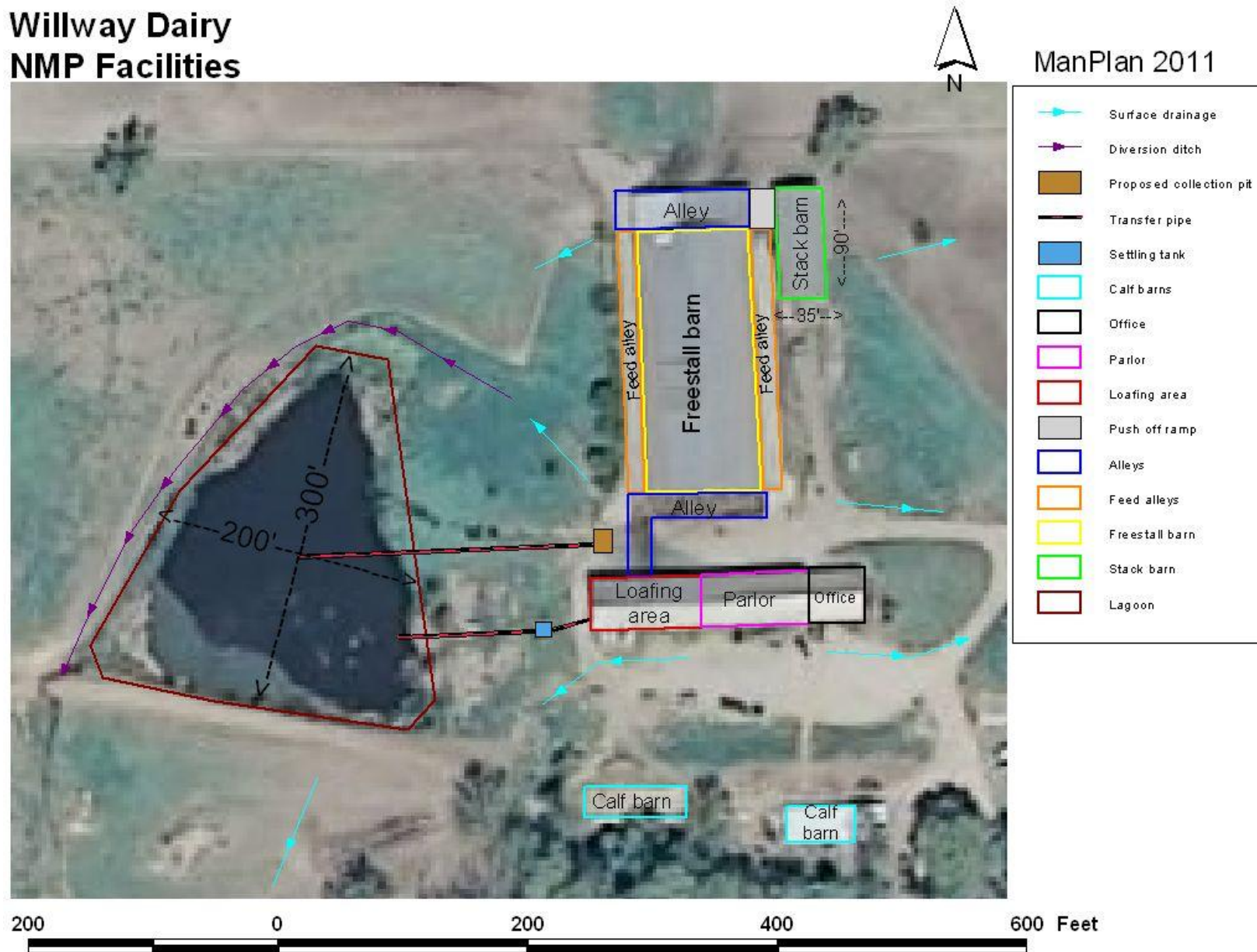
ManPlan 2011

- Lagoon
- Public road setback
- Public roads
- Farm residences
- NFR setbacks
- Non-farm residences
- Stream setbacks
- Streams
- Pond setbacks
- Ponds
- Property line setbacks
- Property lines
- 12 Digit Watersheds

Section 2. Manure and Wastewater Handling and Storage

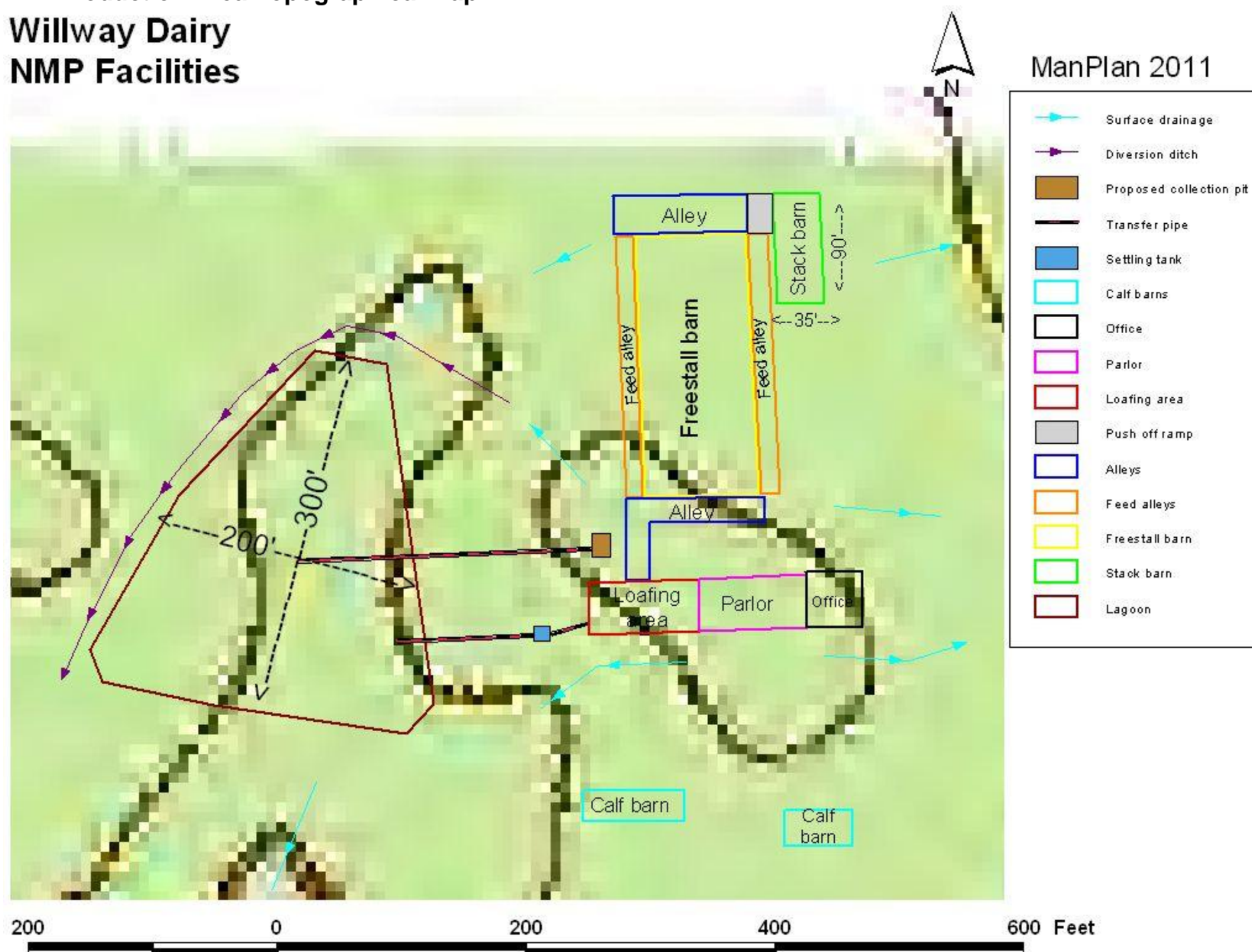
2.1. Map(s) of Production Area

Willway Dairy NMP Facilities



2.2. Production Area Topographical Map

Willway Dairy NMP Facilities



2.1 Animal and Manure Resources

Total manure produced estimates were made using the Animal Waste Management program and AWM reports are included in this section. Tables 2-3 and 2-4 summarizes animal inventories and manure storage capacities.

Liquid manure:

It is estimated that as much as **3,000,000 gallons of liquid manure and wastewater** will be produced annually from the freestall barn, loafing pens, walkways and parlor. Liquid manure is stored in the storage pond located west of the facilities.

Agitation is recommended during pumping in the future to remove solids build-up that may occur. The storage pond has greater than 12 months of storage capacity to facilitate applications to cropland after harvest in the fall or pre-plant in the spring.

Liquid manure and wastewater is planned to be applied with an umbilical system and injected. Traveling gun irrigation equipment may be used on pastures or hayfields in the future if the contents of the storage pond is mostly wastewater effluent with low solids content.

Solid manure & Compost

It is estimated that approximately **4000 tons of solids and slurry manure** will be produced annually from the freestall barn and stored in the dry stack barn.

It is estimated that approximately **75 -85 tons of solid bedded manure** will be produced annually from the calf barn and hutches housing calves

Solid manure is planned to be applied to cropland and hayfields in this NMP with the tandem axle solids-slurry spreader.

Also much of the solid manure is planned to be transferred off-site. Solid manure and bedded manure also may be composted on-site by windrowing in a composting area and turning occasionally to facilitate the composting process.

NOTE:

Composting the manure results in shrinkage and drying of the manure, thereby reducing volume and tonnage of the manure by up to 50%.

2.3. Manure Storage

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected	Maximum Days of Storage
Storage Pond	Holding pond	3,750,000 Gal	2,750,000 Gal	498
Manure pit	Dairy manure dry stack	750 Tons	4,150 Tons	66
Calf barns	Manure pack	60 Tons	85 Tons	258

2.4. Animal Inventory

Animal Group	Type or Production Phase	Number of Animals	Average Weight (Lbs)	Confinement Period	Manure Collected (%)	Storage Where Manure Will Be Stored
Freestall Barn-dry waste	Milk cow (dairy)	300	1,200	Jan Early – Dec Late	60	Manure pit
Loafing Barn-wet waste	Milk cow (dairy)	300	1,200	Jan Early – Dec Late	40	Storage Pond
Heifers	Breeding heifer (dairy)	100	800	Jan Early – Dec Late	0	On pasture
Calf Barn1	Calf (dairy)	25	150	Jan Early – Dec Late	100	Calf barns
Calf Barn 2	Calf (dairy)	25	150	Jan Early – Dec Late	100	Calf barns
Dry Cows	Dry cow (dairy)	50	1,200	Jan Early – Dec Late	0	On pasture

- (1) Number of Animals is the average number of animals that are present in the production facility at any one time
(2) If Manure Collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or that the production facility is unoccupied one or more times during the confinement period.

Freestall Barns, sand bedded



Feed Alley, with manure storage shed on right.



2.5. Normal Mortality Management

To decrease non-point source pollution of surface and ground water resources, reduce the impact of odors that result from improperly handled animal mortality, and decrease the likelihood of the spread of disease or other pathogens, approved handling and utilization methods shall be implemented in the handling of normal mortality losses. If on-farm storage or handling of animal mortality is done, NRCS Standard 316, Animal Mortality Facility, will be followed for proper management of dead animals.

Plan for Proper Management of Dead Animals

Burial on site is the normal planned mortality management practice following proper procedures: Burial sites are a minimum of 300 feet from any well head, 165 feet from property lines or public use area, more than 100 feet from waters of the state or wet weather conveyance, (waterways etc), and in deep suitable soils more than 2 feet above bedrock and ground water table. Ground water shall be greater than 2 feet below the bottom of the burial pit or trench.

A suitable Burial location is in the center of the pasture directly west of the storage pond on a ridge of Fullerton Cherty Silt Loam Silt Loam (FTC).

Alternative mortality management methods are to send to a rendering facility or composting. (See page 51 of Section 3 Emergency Action Plan, for rendering company information).

It is a priority of the operation to handle mortalities promptly, removing them from the facilities as soon as possible after discovery and placing them mortality storage area.

Finished compost may be applied to the fields in this NMP. Compost shall be analyzed for nutrients at least annually for total Nitrogen (N), Ammonia (NH₃), phosphates, (P₂O₅) and potassium oxide (K₂O). A copy of compost analysis shall be provided to the recipient for determining proper agronomic rates for land applications. Records of applications and transfers of compost shall be kept as part of the nutrient management plan. Additional discussion of contingency planning for proper animal disposal in case of catastrophic deaths and can be found in Section 3, page 51, under the Emergency Action Plan.

2.6. Planned Manure Exports off the Farm

Month-Year	Manure Source	Amount	Receiving Operation	Location
Nov 2011	Manure pit	950 Tons	transfer off-site	
Jul 2012	Manure pit	600 Tons	sold off-site	
Nov 2012	Manure pit	600 Tons	sold off-site	
Jan 2013	Manure pit	600 Tons	sold off-site	
Mar 2013	Manure pit	600 Tons	sold off-site	
Jun 2013	Manure pit	600 Tons	transfer off-site	
Jul 2013	Manure pit	600 Tons	sold off-site	
Nov 2013	Manure pit	400 Tons	sold off-site	
Feb 2014	Manure pit	350 Tons	sold off-site	
Mar 2014	Manure pit	350 Tons	sold off-site	
Jun 2014	Manure pit	600 Tons	transfer off-site	
Jul 2014	Manure pit	350 Tons	sold off-site	
Nov 2014	Manure pit	500 Tons	sold off-site	
Jan 2015	Manure pit	750 Tons	sold off-site	
Jun 2015	Manure pit	300 Tons	transfer off-site	

Month-Year	Manure Source	Amount	Receiving Operation	Location
Jul 2015	Manure pit	400 Tons	sold off-site	
Oct 2015	Manure pit	700 Tons	transfer off-site	
Nov 2015	Manure pit	500 Tons	sold off-site	
Jan 2016	Manure pit	500 Tons	transfer off-site	
Jun 2016	Manure pit	100 Tons	transfer off-site	
Jul 2016	Manure pit	500 Tons	sold off-site	
Sep 2016	Manure pit	500 Tons	transfer off-site	

2.7. Planned Manure Imports onto the Farm

Month-Year	Manure's Animal Type	Amount	Originating Operation	Location
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(None)

2.8. Planned Internal Transfers of Manure

Month-Year	Manure Source	Amount	Manure Destination
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(None)

Earthen Storage Pond Closure Plan

If the storage facility is no longer used for manure storage and treatment, it shall be closed as follows:

- Agitate and pump out as much manure and wastewater as possible. Clean water can be added to facilitate pumping of slurry. This slurry manure shall be applied per NRCS conservation standard practice for Nutrient Management, Code 590.
- If the sludge on the bottom is deemed to pose a threat to groundwater or surface water resources, it may be left in place. If it is a threat the sludge shall be removed and land applied as a solid waste according to NRCS standards 590 (listed above), and also Waste Utilization Code 633. The sludge shall be tested for nutrients as well as heavy metals.
- After the manure wastewater and sludge is removed, the earthen impoundment may be filled in and graded to the natural slope of the land, or it may be rehabilitated or converted to a freshwater pond or other use if it meets the NRCS conservation standards for its intended purpose, Pond (Code 378), Irrigation Pit (Code 552) or Irrigation Storage Reservoir (Code 436).
- This closure/ rehabilitation plan for the waste system storage/treatment structure(s) will meet or exceed NRCS technical standards and guidelines.
- Proper maintenance of the facility per "Operations and Maintenance" procedures for the Lagoon, (see page 83) shall be continued until proper closure is completed.
- The schedule for closure will not exceed 360 days from the time that the storage structure is discontinued.

MMP Input Data from AWM for: Willway Dairy

Assisted by: ManPlan Inc

Average Annual Manure Production Stored (for MMP "Analysis" tab)

Facility	Manure		Bedding		Wash Water	Flush Water	Runoff and	Rainfall	Annual Throughput	
	Tons	Gallons	Tons	Gallons	Gallons	Gallons	Extr Precip	Gallons	Rainfall and Runoff	
							Gallons		Tons	Gallons
Storage Pond #1	NA	1261523	NA	13031	237877	0	208991.2	1286635	NA	3008057.2
Dry Stack (Covered) #1	74	NA	9.2	NA	NA	NA	NA	NA	83.2	NA
Dry Stack (Covered) #2	3869	NA	274.5	NA	NA	NA	NA	NA	4143.5	NA
<i>Annual Total</i>	3,943	1,261,523	284	13,031	237,877	0	208,991	1,286,635	4,227	3,008,057

Spreadable or Pumpable Capacity (for MMP "Storage" tab)

Facility	Manure		Bedding		Wash Water	Flush Water	Runoff &	Rainfall	Design Storage	Design Volume w/o	
	Tons	Gallons	Tons	Gallons	Gallons	Gallons	Extrn Precip	Gallons		25Yr Rainfall and	
							Gallons		Period	Tons	Gallons
									Months		
Storage Pond #1	NA	1261531	NA	13031	237879	0	417982	1286560	12	NA	3216983
Dry Stack (Covered) #1	37.3	NA	4.6	NA	NA	NA	NA	NA	6	41.9	NA
Dry Stack (Covered) #2	655.4	NA	46.5	NA	NA	NA	NA	NA	2	701.9	NA

Animal Production Data

Animal	Type of Animal	Number	Weight in Lb	Manure Produced per Animal Unit in CF/Day	Total Manure Produced in CF/Day	Annual Manure Produced in CF	Annual Manure Produced in Gal
Calf (330 lb)	Dairy	50	150	0.90	6.75	2,471	18,479
Milker(75lb Milk)	Dairy	300	1200	1.60	576.00	210,816	1,576,904
Totals		350	N/A	N/A	582.75	213,287	1,595,383

Annual Production vs Storage

Manure Stored			Manure Not Captured		
(CF)	(Gal)	(Lbs)	(CF)	(Gal)	(Lbs)
300083	2244621	18004980	-86797	-649242	-5207820

Animal Waste Management Plan Report

prepared for Willway Dairy

Designed By: ManPlan Inc

Checked By:

Date: 1/6/2012

Date:

Farm Information

of Operating Periods: 1 State: TN Data Source: NRCS-2008

Operating Period: January - December

Climate Data

County: Monroe

Station: ATHENS TN0284

25 Yr - 24 Hr Storm Event: 5.8 inches

Lagoon Loadings:

Rational Design Method:

Barth KVAL: 0

Load Rate for Odor, OCV: 0 lbs VS/cu. ft/day

LRV Max: 0.00625 lbs VS/cu. ft/day

NRCS Design Method:

Anaerobic Load Rate: 0 lbs VS/1000 cu. ft/day

Month	Prec. (in)	Evap. (in)
January	6.09	1.10
February	4.91	1.50
March	6.32	2.70
April	4.80	4.20
May	4.86	4.60
June	4.08	5.10
July	4.65	5.30
August	3.69	4.90
September	5.04	3.40
October	3.61	2.60
November	5.01	1.60
December	5.33	1.20
Total	58.39	38.20

Animal Data

Animal	Type	Quantity	Weight	Manure	VS	TS	Manure	Manure	VS	TS
			lbs	cu.ft/day/AU	lbs/day/AU	lbs/day/AU	cu.ft/day	lbs/day	lbs/day	lbs/day
Calf (330 lb)	Dairy	50	150	0.90	7.70	9.20	6.75	405.0	57.75	69.00
Milker(75lb Mi	Dairy	300	1200	1.60	11.00	14.00	576.00	34560.0	3960.00	5040.00
Totals		350	N/A	N/A	N/A	N/A	582.75	34965.0	4017.75	5109.00

Location Data

Percent of Manure Deposited in Each Location:

Period 1

calf barns	Animal Name	Percent Manure
	Milker(75lb Milk)	0
	Calf (330 lb)	100
Freestall-dry	Animal Name	Percent Manure
	Milker(75lb Milk)	60
	Calf (330 lb)	0
Freestall-liquid	Animal Name	Percent Manure
	Milker(75lb Milk)	40
	Calf (330 lb)	0
Totals	Animal Name	Percent Manure
	Milker(75lb Milk)	100
	Calf (330 lb)	100

Additions Data

Waste Water VS Loading: 12.9

Operating Period: 1

Location	Wash Water	Flush Water	Bedding	Amount
	gal/day	gal/day		lbs/day
Parlor Wash	650.00	0.00		0.00
Freestall-liquid	0.00	0.00	Sand	500.00
Freestall-dry	0.00	0.00	Sand	1500.00
calf barns	0.00	0.00	Sawdust - Shavings	50.00

Runoff Data

Runoff Volume Method: Calculate Monthly Runoff Volumes with AWM

Pervious Watershed Area: 0 acres

Pervious Curve Number Storm 90

Pervious Curve Number Monthly 90 (1 day), 77 (30 day)

AWM Version: 2.4.0 DB: 2.80

Friday, January 06, 2012

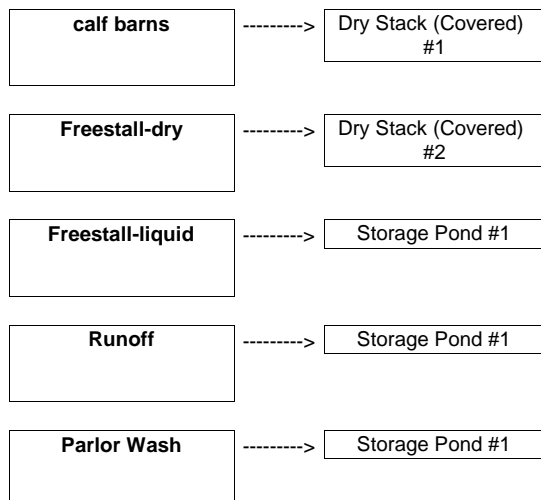
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Impervious Area: 6500 sq. ft
25 Year Pervious: 0.00 cu. ft
25 Year Impervious: 3010.00 cu. ft
25 Year Total: 3010.00 cu. ft

Runoff Volumes (1000 cu. ft.)

Month	Pervious	Impervious	Month Total
January	0.00	2.99	2.99
February	0.00	2.35	2.35
March	0.00	3.11	3.11
April	0.00	2.29	2.29
May	0.00	2.32	2.32
June	0.00	1.91	1.91
July	0.00	2.21	2.21
August	0.00	1.70	1.70
September	0.00	2.42	2.42
October	0.00	1.66	1.66
November	0.00	2.40	2.40
December	0.00	2.58	2.58
Total	0.00	27.94	27.94

Management Train



Facility Volume Data

Operating Period 1

Facility	Manure	Wash Water	Flush Water	Bedding	Total Vol
Dry Stack (Covered) #2	352.35	0.00	0.00	17.46	369.81
Dry Stack (Covered) #1	6.75	0.00	0.00	3.17	9.92
Storage Pond #1	460.80	86.89	0.00	4.76	552.45

Waste Facilities

Dry Stack (Covered) #1

Max. Storage Vol. Method: Storage Volume

Storage Months: 6 months

Critical Months: May - Apr

Design Dimensions

Shape: Rectangle

Sideslope:

Storage Depth: 2.0 ft

Freeboard: 0.0 ft

Top Length: 130.4 ft

Bottom Length: 130.4 ft

Top Width: 7.0 ft

Bottom Width: 7.0 ft

Bot Dimensions 7.0 x 130.4 ft

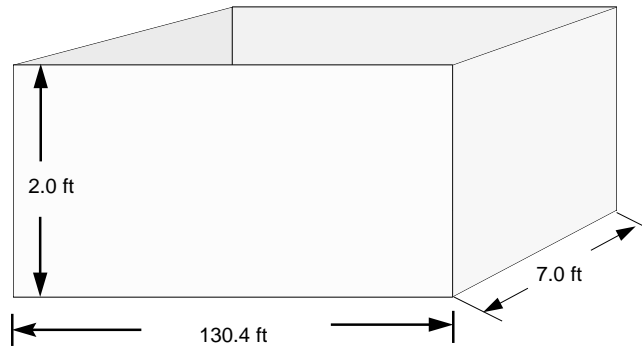
TopDimensions: 7.0 x 130.4 ft

Design Quantities

25Yr24Hr Storm Depth:

Prec Minus Evap Depth:

Volume Required (Wastes): 1826 cu. ft



Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	0	<input type="checkbox"/>	0.31	0.38	0.00	0.31
February	0	<input type="checkbox"/>	0.29	0.26	0.00	0.29
March	0	<input type="checkbox"/>	0.31	0.28	0.00	0.31
April	0	<input type="checkbox"/>	0.30	0.05	0.00	0.30
May	0	<input type="checkbox"/>	0.31	0.02	0.00	0.31
June	0	<input type="checkbox"/>	0.30	-0.08	0.00	0.30
July	0	<input type="checkbox"/>	0.31	-0.05	0.00	0.31
August	0	<input type="checkbox"/>	0.31	-0.09	0.00	0.31
September	0	<input type="checkbox"/>	0.30	0.12	0.00	0.30
October	0	<input type="checkbox"/>	0.31	0.08	0.00	0.31
November	0	<input type="checkbox"/>	0.30	0.26	0.00	0.30
December	0	<input type="checkbox"/>	0.31	0.31	0.00	0.31

Dry Stack (Covered) #2

Max. Storage Vol. Method: Storage Volume

Storage Months: 2 months

Critical Months: May - Apr

Design Dimensions

Shape: Rectangle

Sideslope:

Storage Depth: 6.5 ft

Freeboard: 0.0 ft

Top Length: 90.4 ft

Bottom Length: 90.4 ft

Top Width: 39.0 ft

Bottom Width: 39.0 ft

Bot Dimensions 39.0 x 90.4 ft

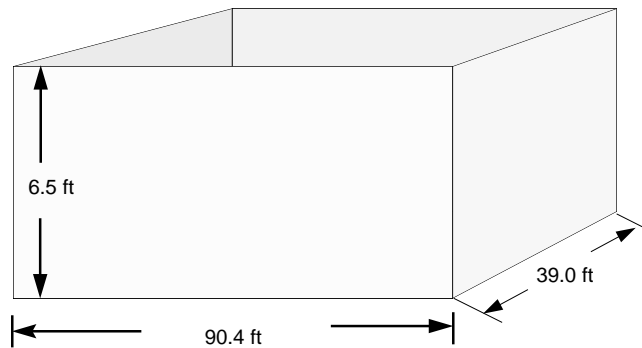
TopDimensions: 39.0 x 90.4 ft

Design Quantities

25Yr24Hr Storm Depth:

Prec Minus Evap Depth:

Volume Required (Wastes): 22928 cu. ft



Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	0	<input type="checkbox"/>	11.46	1.47	0.00	11.46
February	0	<input type="checkbox"/>	10.72	1.00	0.00	10.72
March	0	<input type="checkbox"/>	11.46	1.06	0.00	11.46
April	0	<input type="checkbox"/>	11.09	0.18	0.00	11.09
May	0	<input type="checkbox"/>	11.46	0.08	0.00	11.46
June	0	<input type="checkbox"/>	11.09	-0.30	0.00	11.09
July	0	<input type="checkbox"/>	11.46	-0.19	0.00	11.46
August	0	<input type="checkbox"/>	11.46	-0.36	0.00	11.46
September	0	<input type="checkbox"/>	11.09	0.48	0.00	11.09
October	0	<input type="checkbox"/>	11.46	0.30	0.00	11.46
November	0	<input type="checkbox"/>	11.09	1.00	0.00	11.09
December	0	<input type="checkbox"/>	11.46	1.21	0.00	11.46

Storage Pond #1

Max. Storage Vol. Method: Storage Volume

Storage Months: 12 months

Critical Months: May - Apr

Design Dimensions

Shape:	Rectangle	Top Length:	300.0 ft
Sideslope:	3:1	Bottom Length:	204.0 ft
Storage Depth:	14.0 ft;	Top Width:	200.0 ft
Freeboard:	2.0 ft	Bottom Width:	104.0 ft
		Bot Dimensions	104.0 x 204.0 ft
		TopDimensions:	200.0 x 300.0 ft

**Permament
Additional
Storage**

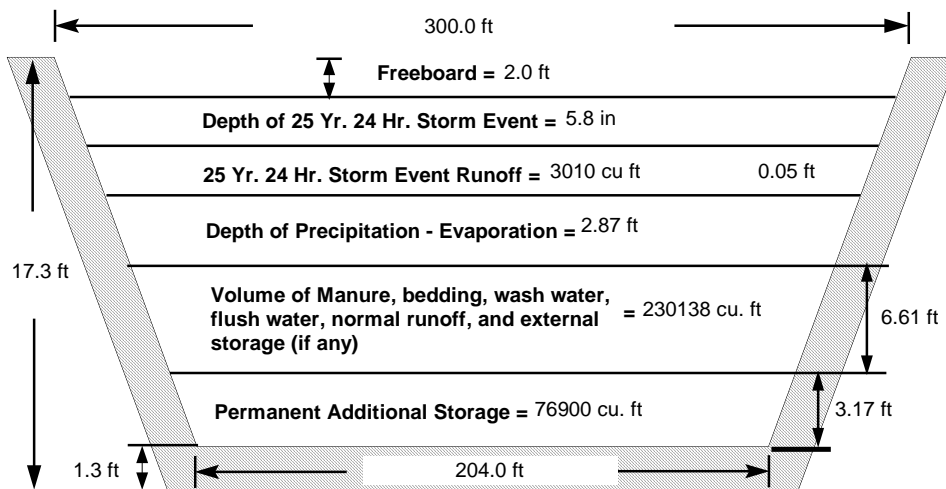
Soil Liner

Liner Depth: 1.3 ft **Permeability:** .0001 ft/day

Liquid Depth: 11.4 ft
6 **Specific Discharge:** .001 ft³/ft²/day

Design Quantities

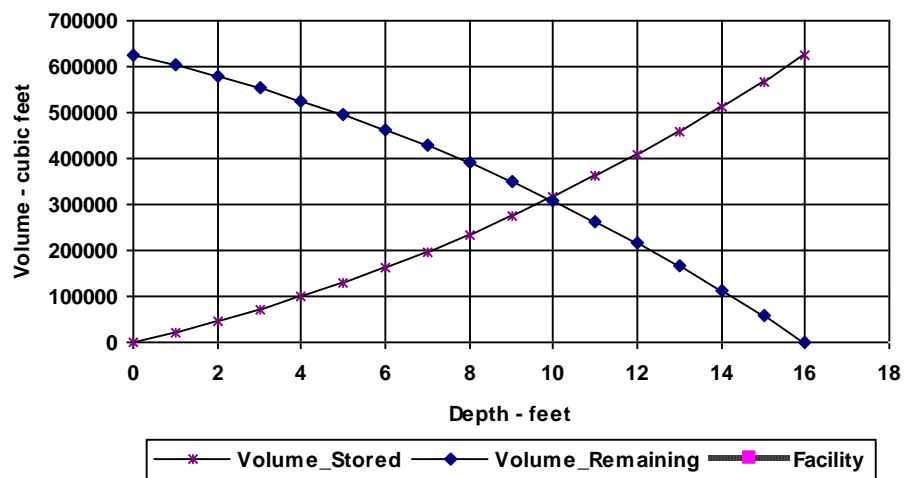
25Yr24Hr Storm Depth:	5.8 in
Prec Minus Evap Depth:	2.87 ft
Volume Required (Wastes):	230138 cu. ft



Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	2.99	<input type="checkbox"/>	17.13	27.00	0.00	47.11
February	2.35	<input type="checkbox"/>	16.02	19.84	0.00	38.21
March	3.11	<input type="checkbox"/>	17.13	23.12	0.00	43.36
April	2.29	<input type="checkbox"/>	16.57	10.81	0.00	29.68
May	2.32	<input type="checkbox"/>	17.13	9.86	0.00	29.30
June	1.91	<input type="checkbox"/>	16.57	4.39	0.00	22.87
July	2.21	<input type="checkbox"/>	17.13	6.61	0.00	25.94
August	1.70	<input type="checkbox"/>	17.13	3.06	0.00	21.89
September	2.42	<input type="checkbox"/>	16.57	14.52	0.00	33.52
October	1.66	<input type="checkbox"/>	17.13	9.89	0.00	28.67
November	2.40	<input type="checkbox"/>	16.57	20.03	0.00	39.00
December	2.58	<input type="checkbox"/>	17.13	22.88	0.00	42.59

Stage Storage Curve

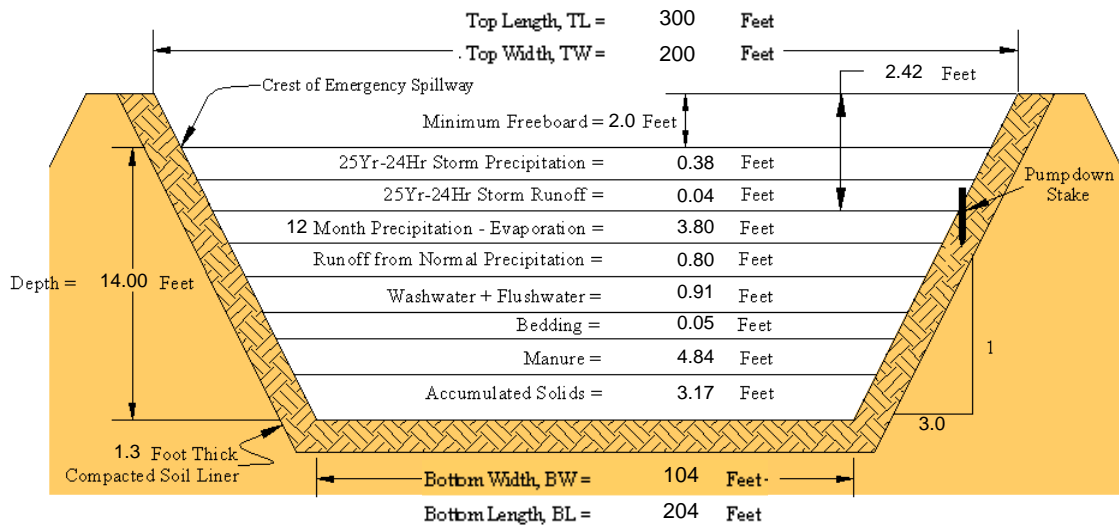


AWM

Waste Storage Pond Data for: Willway Dairy

Designed by: ManPlan Inc

Facility	Rectangular Storage Pond #1	
Storage Period	12 Months	
Manure & External Effluent	168,654 Cubic Feet	1,261,532 Gallons
Bedding	1,742 Cubic Feet	13,030 Gallons
Flush Water	0 Cubic Feet	0 Gallons
Wash Water	31,802 Cubic Feet	237,879 Gallons
Runoff from Drainage Area		
25Yr-24Hr Storm	3,010 Cubic Feet	22,515 Gallons
Normal Rainfall	27,940 Cubic Feet	208,991 Gallons
Rainfall on Pond Surface		
25Yr-24Hr Storm	29,000 Cubic Feet	216,920 Gallons
Normal Rainfall minus Evaporation	172,000 Cubic Feet	1,286,560 Gallons
Accumulated Solids	76,900 Cubic Feet	575,212 Gallons
Design Operating Volume ..	402,138 Cubic Feet	3,007,992 Gallons
Total Storage Volume	434,148 Cubic Feet	3,247,427 Gallons
Ramp Volume (if applicable)	0 Cubic Feet	
Structural Volume (includes effects of ramp if present)	625,152 Cubic Feet	



Calf barns

AWM

Solids Stacking Facility Data for: Willway Dairy

Designed by: ManPlan Inc

Facility **Dry Stack (Covered) #1**

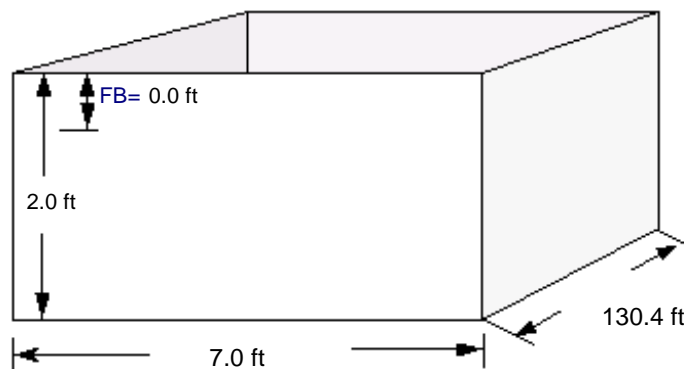
Storage Period 6 *Months*

Manure 1,242 *Cubic Feet*

Bedding 584 *Cubic Feet*

Total Volume to Store 1,826 *Cubic Feet*

Total Volume of Facility 1,826 *Cubic Feet*



Ramped manure pit/ dry stack

AWM

Solids Stacking Facility Data for: Willway Dairy

Designed by: ManPlan Inc

Facility Dry Stack (Covered) #2

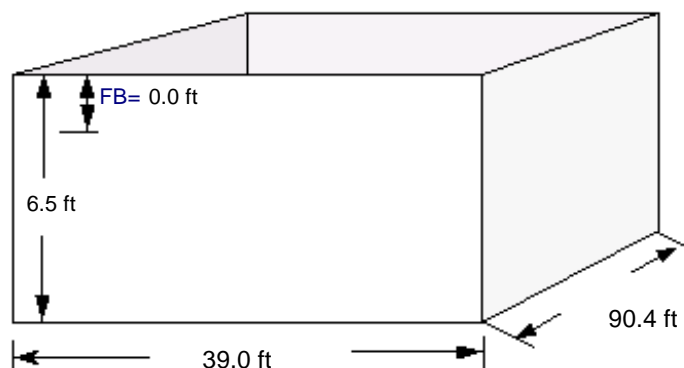
Storage Period 2 Months

Manure 21,845 Cubic Feet

Bedding 1,083 Cubic Feet

Total Volume to Store 22,928 Cubic Feet

Total Volume of Facility 22,916 Cubic Feet



Section 3. Farmstead Safety and Security

3.1. Emergency Response Plan

In Case of an Emergency Storage Facility Spill, Leak or Failure

Implement the following first containment steps:





- Stop all other activities to address the spill.
- Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
- Call for help and excavator if needed.
- Complete the clean-up and repair the necessary components.
- Assess the extent of the emergency and request additional help if needed.

In Case of an Emergency Spill, Leak or Failure during Transport or Land Application

Implement the following first containment steps:

- Stop all other activities to address the spill and stop the flow.
- Call for help if needed.
- If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
- Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
- If flow is coming from a tile, plug the tile with a tile plug immediately.
- Assess the extent of the emergency and request additional help if needed.

Farm Information

Farm Name	Willway Dairy Farm
Address	Farm Address: 5290 Holt Road Sweetwater, TN 37874 Mailing address: 5290 Holt Road Sweetwater, TN 37874
Farm Phone	Will Maloney: 423-351-4214 cell or Farm: 423-836-8636
Permit #	TNA00023
Directions to Farm	<div> Sweetwater, TN</div> <div><div>1. Head northeast on N Main St toward Biggs St<div>go 0.5 mi total 0.5 mi</div></div><div> 2. Take the 3rd left onto TN-322 W/Oakland Rd<div>go 2.9 mi total 3.4 mi</div><div>About 5 mins</div></div><div> 3. Keep right at the fork<div>go 1.4 mi total 4.8 mi</div><div>About 2 mins</div></div><div> 4. Turn right onto Holt Rd/Kingston Rd<div>go 0.8 mi total 5.7 mi</div><div>Continue to follow Holt Rd Destination will be on the left About 2 mins</div></div><div> 5290 Holt Rd, Sweetwater, TN 37874</div></div>

Emergency Contacts

	Name	Emergency Phone	Cell Phone
Farm Owner	Will Maloney	423-836-8636	423-351-4214
Farm Manager			
Sheriffs Office Loudon County Monroe County	Tim Guider Bill Bivens	865-986-4823 423-442-3911	911
Fire Department	Sweetwater Fire Department	911 423-337-6724	
Ambulance	Athens	911 423-745-3336	
Excavation Equipment: Backhoe, Dozer	Washburn Backhoe Services	423-337-7114	

Agency Contacts

Contact Agency	Person	Day Phone	Emergency Number
TWRA - Tenn. Wildlife Resources Agency			(800) 890 TENN or (800) 890-8366
TDEC-Environmental Assistance Center			(888) 891-8332
Loudon County Monroe County Sheriffs Office	Tim Guider Bill Bivens	865-986-4823 423-442-3911	911
State Veterinarian: (If mortality issues)	Dr. Charles Hatcher, Nashville, TN	(615) 837-5120	
UT Extension, Madisonville and Loudon		423-442-2433 or 5931, 865-458-5612	

Be prepared to provide the following information:

- Your name and contact information.
- Farm location (driving directions) and other pertinent information.
- Description of emergency.
- Estimate of the amounts, area covered, and distance traveled.
- Whether manure has reached surface waters or major field drains.
- Whether there is any obvious damage: employee injury, fish kill, or property damage.
- Current status of containment efforts.

3.2. Biosecurity Measures

Biosecurity is critical to protecting livestock and poultry operations. Visitors must contact and check in with the producer before entering the operation or any production or storage facility.



BIOSECURITY FOR DAIRY FARMS

Introduction

Outbreaks of infectious disease have shown that it pays to be conscientious about preventing and controlling infectious disease on livestock operations. This concept is known as biosecurity. Biosecurity refers to management practices that reduce the chances infectious diseases will be carried onto the farm by animals or people. Biosecurity also reduces the spread of infectious disease on farms.

Animal + infectious agent + environment = disease

All infectious diseases result from the interplay between the animal and its ability to resist disease (its immunity), an infectious agent (bacteria, viruses and parasites) and the environment. For example, producers can prevent some diseases by using vaccination to increase immunity. Producers can also prevent disease by keeping infectious agents from coming onto their farm. If an infectious agent is already on the farm, producers can try to eradicate it or control its spread.

Strategic vaccination

Vaccination is an essential component of disease prevention. Setting up a well planned strategic vaccination program means determining what diseases to vaccinate against, identifying who will most benefit from vaccination and finding out when they will most need the protection that vaccines provide. For more details on planning a vaccination program, please contact your herd veterinarian.

Preventing the introduction and spread of infectious diseases

Note: Every animal that dies unexpectedly on your farm should be examined by your herd veterinarian to determine the cause of death.

1. Keeping a closed herd

Keeping a closed herd is one way to protect cattle from infectious disease. In a closed herd, no cattle enter the farm either by purchase or loan and resident cattle do not make contact with any cattle from other farms. A herd is **not** closed if

- Cattle are purchased or boarded;
- Cattle return to the herd after going to shows, community pastures or performance evaluation centers;
- Cattle use a pasture that shares a fence line with cattle in pasture on a different farm;
- Bulls are purchased, borrowed or loaned; and
- Cattle from the herd are transported by someone else or in someone else's vehicle

2. Purchasing new cattle

It is important to plan the introduction of animals to minimize the risk that an infectious disease will be brought in at the same time. Three factors are important in reducing the risk of infectious diseases when purchasing new cattle.

- The protection you have given your herd by proper vaccination
- The source of purchased cattle, including how they are transported to the farm
- The method you will use to actually introduce the new cattle to the rest of the herd

3. Resident cattle

Make certain your own cattle are properly vaccinated according to the manufacturer's and your herd veterinarian's recommendations before bringing new cattle into the herd.

4. The source of purchased cattle

- Bring in only animals from herds where you know the health status.
- Bring in only animals from herds with a known effective vaccination program. Get specific information about the vaccination history such as when vaccine was used and when it was given. If killed vaccines were used, make sure that a primary series (two doses given a few weeks apart) was given.
- Avoid purchasing animals from unknown sources or that have been mixed with other cattle
- Buy heifers when purchasing a group of cattle. Because they aren't milking, heifers are easier to quarantine.
- Ask for health information about purchased cattle. Ask for the DHIA somatic cell count information on milking cows. Test the bulk tank for contagious mastitis.
- Transport animals in a vehicle that has been cleaned and disinfected before pick up.

5. Introducing new arrivals

- Quarantine new animals for 30 days before allowing contact with animals on-farm.
- Designate your quarantine area. It should be separated from other cattle on your farm. To prevent the spread of respiratory diseases, quarantined cattle should not share the same airspace with resident cattle.
- Quarantined cattle should not share feeders, waterers or equipment with resident cattle.
- Use a medicated foot bath before allowing purchased cattle to enter the herd.
- Prevent the spread of contagious mastitis by milking the new animals last. Sanitize the milking equipment after milking new cattle.
- Check the new animal's temperature every day or at least every other day during the quarantine period. If it develops a fever, have it checked out by your veterinarian.
- Vaccinate cattle while they are in quarantine.
-

6. Test all purchased cattle for infection with

- BVD virus
- Johne's disease
- Mastitis caused by *Staphylococcus aureus*, *Streptococcus agalactiae* and *Mycoplasma bovis*
- Bovine leukosis (optional)

It can take 1-2 weeks to get test results so collect and submit the samples as soon as the animal arrives.

7. Controlling farm traffic

Infectious diseases can be carried by people and equipment too. If you borrow equipment from other farms, make sure it has been cleaned before using it on your farm. Producers should limit access on the farm to calves and fresh cows since they are most susceptible to infectious disease.

Some steps to reduce the risk of introducing infectious diseases:

- Limit people's access to the barn. This may mean locking the door to the barn.
- Post a warning sign asking visitors to keep out. It helps to provide information on who to contact or a telephone number to call instead of entering the barn.
- Make sure visitors wear clean boots and clothing in the barn. This is important if visitors have already been in other barns. Provide some large size coveralls and boots in the barn for visitors to wear. Disposable plastic boots can be used but they wear out quickly.
- Make sure visitors use a foot bath and clean their boots with a brush and disinfectant **before** entering your barn.
- Have bull calves and other sale animals picked up without allowing the dealer or transporter to enter the barn.
- Have dead animals picked up without allowing the livestock renderer to enter your barn or come in contact with your animals.
- Keep a record of visitors.
- Use your own halters and ropes.

It is difficult to control all traffic on the farm but you can identify the traffic that represents the most risk. These include people who frequently visit other farms and people who have already visited other farms on the day they visit your farm.

Major infectious diseases of cattle in Wisconsin and their primary means of spread

Disease	Major means of spread
Bovine viral diarrhea (BVD)	Direct contact with infected cattle or their body fluids
Contagious mastitis (Staph aureus, Strept. Agalactiae)	Contact with infected milk, usually at milking
<i>Mycoplasma bovis</i>	Contact with respiratory carrier or infected milk
Bovine leukosis virus	Contact with blood of infected cattle
IBR, BRSV and PI ₃ viruses	Spread through the air
E. coli, rotavirus and coronavirus	Contact with manure from infected cattle
Salmonellosis	Contact with manure from infected cattle
Leptospirosis	Contact with urine from infected carrier cattle
Hairy heel warts	Contact with environment of infected cows
Johne's disease	Contact with manure from infected cattle

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3.3. Catastrophic Mortality Management

Refer to NRCS standards, or state guidance, regarding appropriate catastrophic animal mortality handling methods.

Plan for Catastrophic Animal Mortality Handling

The following table describes how you plan to manage catastrophic loss of animals in a manner that protects surface and ground water quality. You must follow all national, state and local laws, regulations and guidelines that protect soil, water, air, plants, animals and human health.

A Rendering Service will be called as first choice to manage large quantities of mortalities.

Closest rendering company is: Griffin Industries LLC
2905 Long Street,
Chattanooga, TN 37409
Phone 423 266 6504

If a rendering truck is not available, composting or burial may be used as alternative methods.

Composting: Temporary composting may be allowed under direction of the State Veterinarian's office. A site must be chosen with impermeable surface to prevent leaching into groundwater. Sides of the compost bins may be temporarily made of round bales of hay or stalks. Sufficient composting material must be used. Finished compost must be spread at agronomic rates. Up to 50% of the compost may be reused as carbon source.

(See Tennessee Emergency Disposal of Dead Animals in this section.)

Important! In the event of catastrophic animal mortality, contact the following authority before beginning carcass disposal:

Authority name: State Veterinarian of Tennessee
Contact name: Dr. Charles Hatcher
Phone number: 615 837-5120

3.4. Fuels & Chemical Handling

Gasoline and diesel fuel is stored on site in above-ground storage tanks located northwest of the dairy barn. These tanks are inspected frequently. No leaks were observed. Detergents and disinfectants are stored in the tank room south of the dairy barn to be used for power washing and cleanup of the milking equipment. Roundup herbicide and other weed control chemicals are stored in the machine shed and used for maintaining fence lines and pastures as needed. No other hazardous chemicals are stored at this location.

Fuel handling:

Small spills during fuel transfer are bound to occur from time to time. Petroleum fuel evaporates rapidly at the land surface; however fuel readily seeps into the soil. Local geology and soil type determines how quickly fuel may reach groundwater supplies. Once in the groundwater environment, fuel is relatively stable, making it difficult to clean up. Even small spills or leaks in the same place over time are a potential threat to water resources. To reduce potential leaks and spills during fuel transfer:

- Always supervise fuel transfer from storage to equipment to prevent spillover.
- Use a can to catch any drops that may follow after shutting off the fuel nozzle.
- Replace a leaking or defective nozzle promptly.
- Enforce a "no smoking" rule at the fuel handling and storage facility.
- Keep fuel pumps and nozzles secure from children or vandalism.
- Label each pump or nozzle as to the type of fuel dispensed.

Above-ground Storage Tanks (ASTs) provide easy access and greater opportunity to observe and monitor tanks that may be leaking as compared to underground tanks. However, placement of tanks above the ground requires that tanks be protected from impact by farm equipment and personal vehicles. Spending some time on the proper placement of a new tank or implementing safety procedures to an existing tank can greatly reduce any risks associated with an AST.

Following are specific points that should be addressed when conducting an assessment of your ASTs.

- Comply with state-local rules for electrical safety and fire prevention. Keep a fire extinguisher in close proximity (e.g. within 75 feet) of ASTs.
- AST's should be located at least 50 feet from any building or combustible storage.
- Properly label tank contents, describe the health and physical hazards of the product.
- Secure against vandalism and tampering.
- If top-opening only, place on a stable base of timbers, blocks, concrete, etc. ASTs should not be in contact with bare soil.
- Display a "No Smoking" sign.
- Guard tank against impact. Choose a site where farm vehicles can easily maneuver for fueling.
- Enclose wiring in a conduit.
- Locate ASTs where soil strength is adequate to hold the weight of a full storage tank (or tanks).

CHEMICALS: For hazardous chemicals that may be stored on this site in the future, the following guidelines should be implemented.

	<i>Measures Taken</i>
X	All chemicals are stored in proper containers. Expired chemicals and empty containers are properly disposed of in accordance with state and federal regulations. Pesticides and associated refuse are disposed of in accordance with the FIFRA label.
X	Chemical storage areas are self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.
X	Chemical storage areas are covered to prevent chemical contact with rain or snow.
X	Emergency procedures and equipment are in place to contain and clean up chemical spills.
X	Chemical handling and equipment wash areas are designed and constructed to prevent contamination of surface waters and waste water and storm water storage and treatment systems.
X	All chemicals are custom applied and no chemicals are stored at the operation. Equipment wash areas are designed and constructed to prevent contamination of surface waters and waste water and storm water storage and treatment systems.

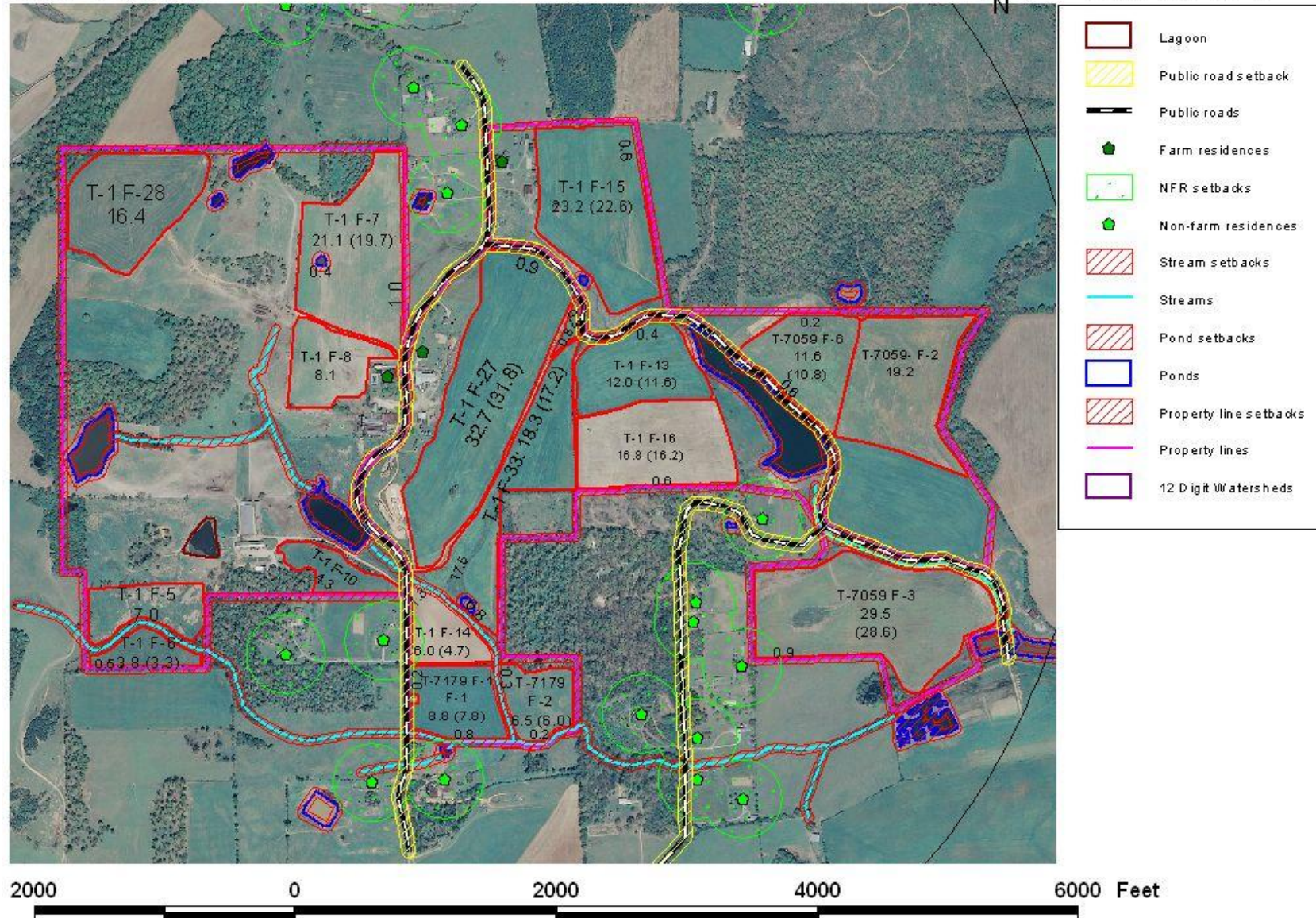
Section 4. Land Treatment

4.1. Map(s) of Fields and Conservation Practices

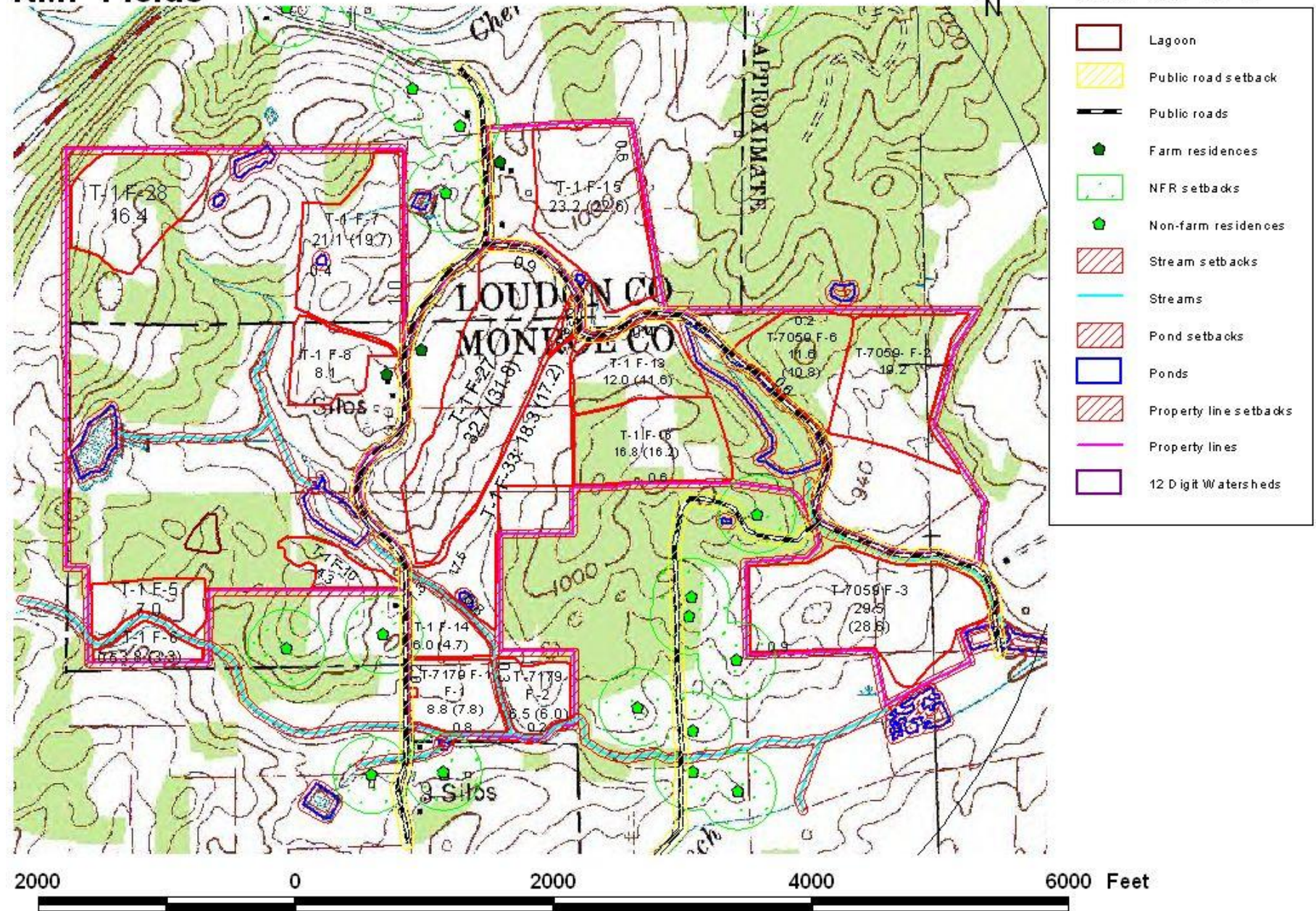
Willway Dairy NMP Fields



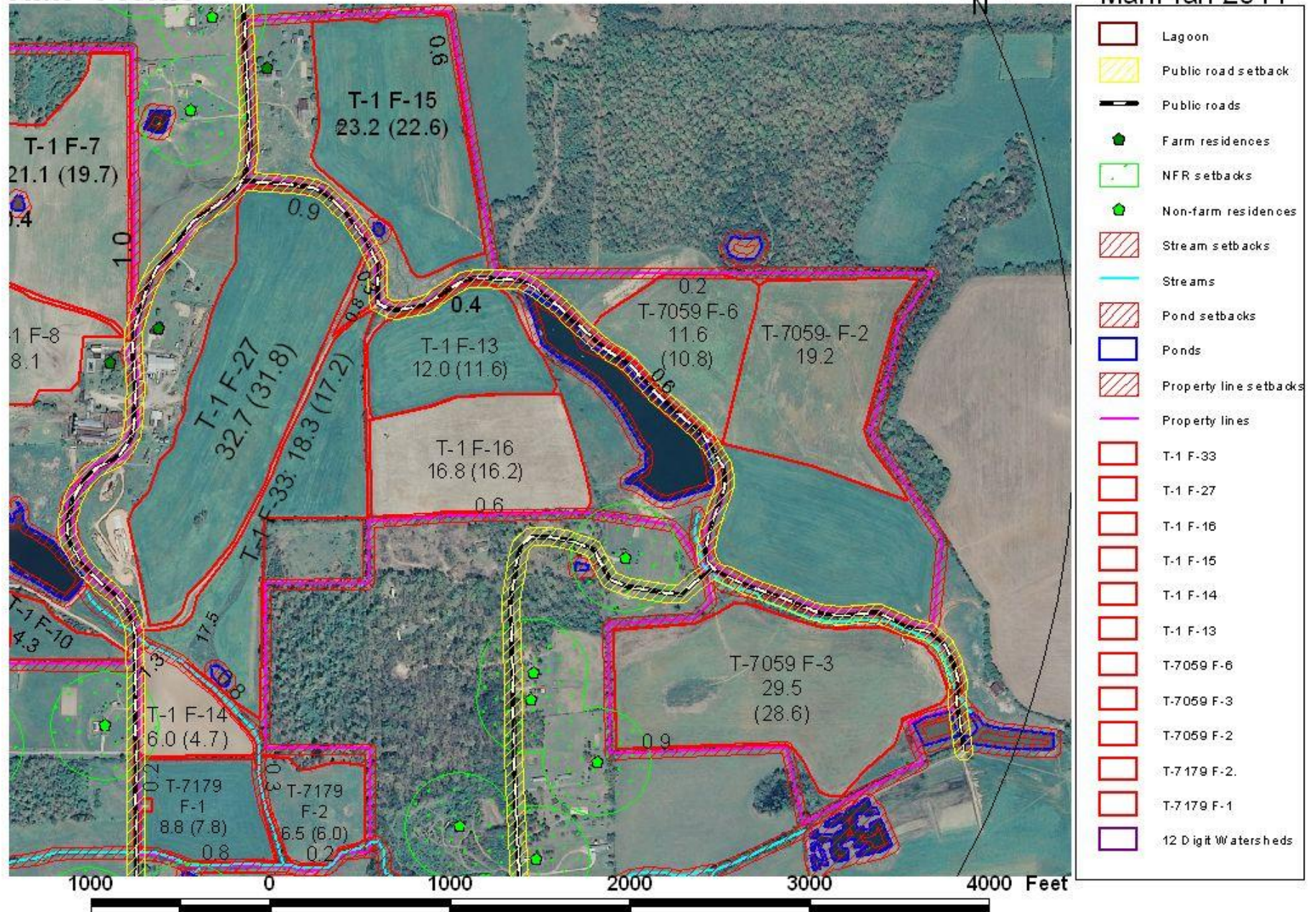
ManPlan 2011



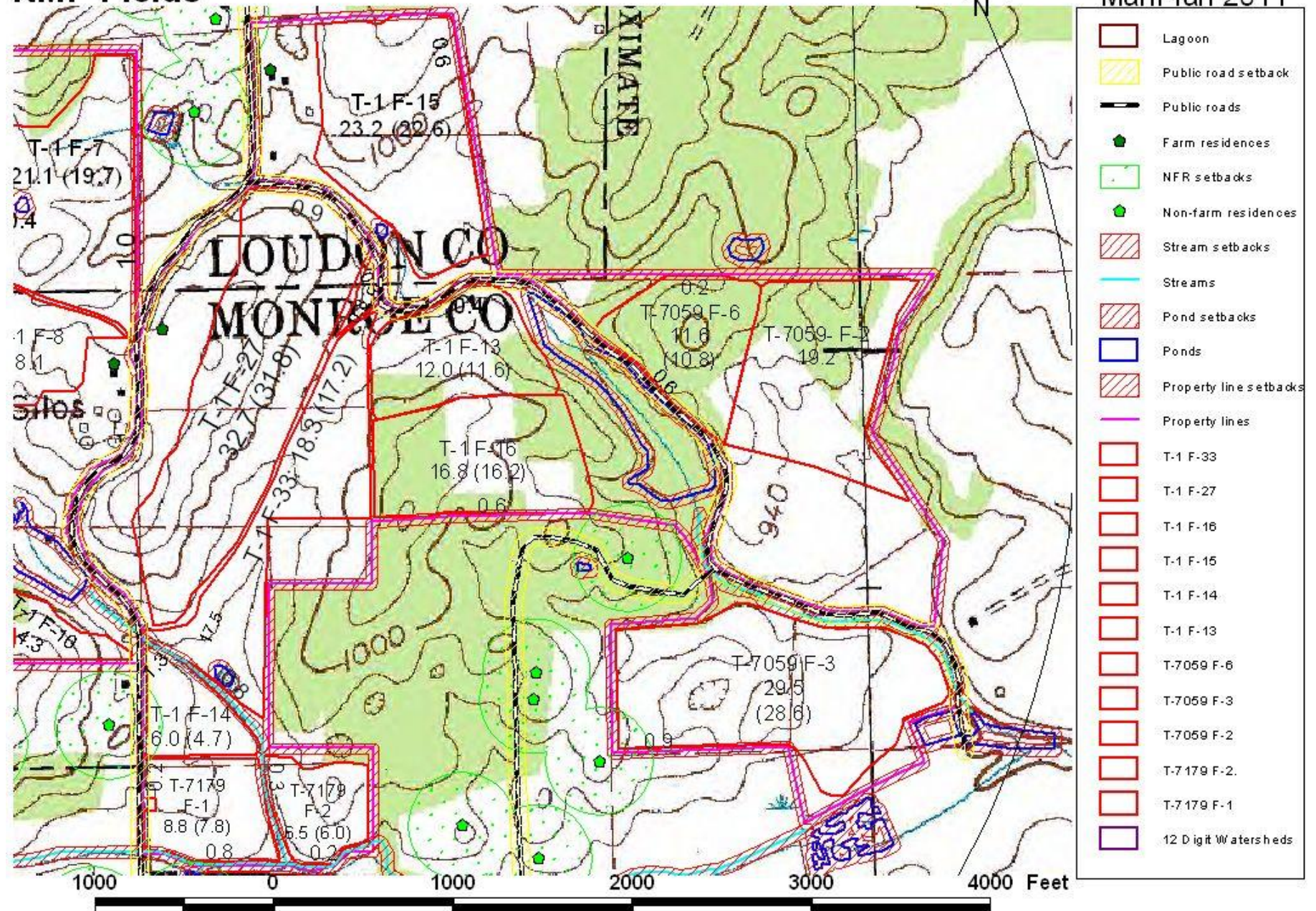
Willway Dairy NMP Fields



Willway Dairy NMP Fields



Willway Dairy NMP Fields



Willway Dairy NMP Fields

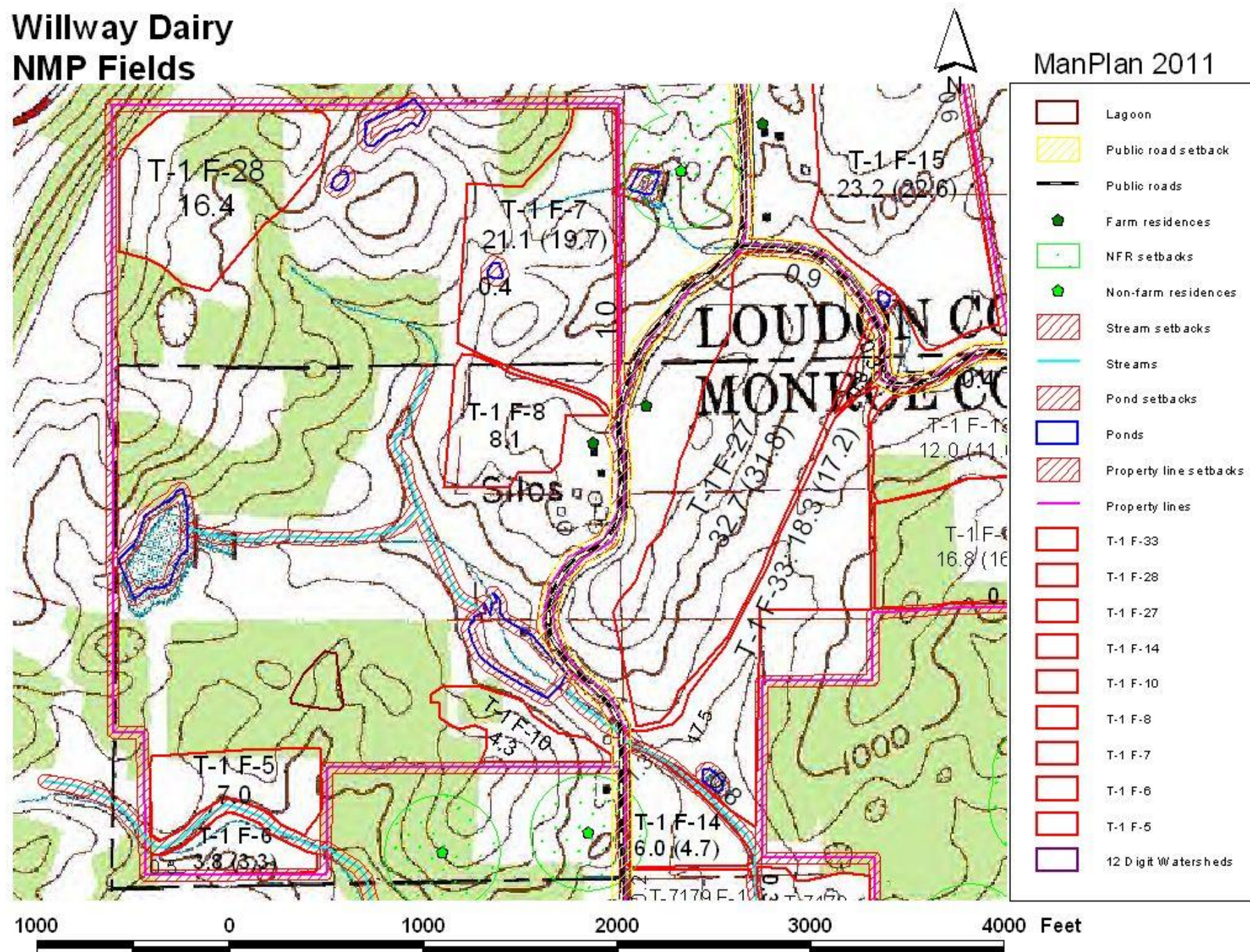


ManPlan 2011



1000 0 1000 2000 3000 4000 Feet

Willway Dairy NMP Fields



4.2. Land Treatment Conservation Practices

This section has individual field information for all fields in the nutrient management plan, including: Aerial photos and topographical maps, marked with setbacks and conservation practices implemented, soil tests results and RUSLE-2 individual field profiles.

Tabbed Information for each field:

- **FSA map**
- **Overview Map, (with conservation practices)**
- **Soil type maps**
- **RUSLE2 Individual Field Profile Report**
- **Soil Test results**

Necessary conservation practices have been established and maintained on cropland, hayfields and pastures where animal by-products are applied. All fields to maintain vegetative filter strips or riparian buffers along the river. Refer to the NRCS conservation plan for any additional practices that may be implemented on this farm.

The following NRCS Standard Practices apply to this CNMP and are included in Section 10 for reference.

313 - Waste Storage Structure
412 - Fence
511 -- Forage Harvest Management
590 -- Nutrient Management
633 -- Waste Utilization

Planned Land Treatment:

This section of the plan addresses management practices for all fields to reduce soil losses to or below tolerable soil losses or “T” values. Topography, soil types, slopes and lengths of slopes, crop yields, and crop management practices were taken into consideration as well as conservation practices and land treatment operations. RUSLE2 soil loss calculations were completed for all fields in this plan and field inspections were carried out in the spring of 2011.

Soil loss for all fields are below “T” levels with the current system of land treatment for no-till crops, forage crops & grazing management.

Soil types present in the fields included in this Nutrient Management Plan are:

Code	Soil Description	Acres	Percent of field	Non-Irr Class
FtD	Fullerton cherty silt loam, 12 to 20 percent slopes	62	22.3%	IVe
FtC	Fullerton cherty silt loam, 5 to 12 percent slopes	44.9	16.1%	IIIe
DmC	Dunmore silt loam, 5 to 12 percent slopes	21.2	7.6%	IIIe
FcD	Fullerton cherty silt loam, moderately steep phase	20.2	7.3%	IVe
LeB	Leadvale silt loam, 2 to 5 percent slopes	17.7	6.4%	Ile
Ha	Hamblen silt loam	8.6	3.1%	IIw
MnC	Minvale silt loam, 5 to 12 percent slopes	8.6	3.1%	IIIe
FcC	Fullerton cherty silt loam, sloping phase	8.4	3.0%	IIIe
FtE	Fullerton cherty silt loam, 20 to 40 percent slopes	6.5	2.3%	VIIe
FsC	Fullerton silt loam, sloping phase (dewey)	6.5	2.3%	IIIe
MnB	Minvale silt loam, 2 to 5 percent slopes	6.4	2.3%	Ile
BoD2	Bolton silt loam, eroded moderately steep phase	5.7	2.0%	VIe
BoC2	Bolton silt loam, eroded sloping phase (7-12%)	5.6	2.0%	IVe
EtC	Etowah silt loam, 5 to 12 percent slopes	5	1.8%	IIIe
DgC3	Dewey silty clay loam, 5 to 12 percent slopes, severely eroded	4.9	1.8%	IVe
DeC	Dewey silt loam, 5 to 12 percent slopes	4.6	1.6%	IIIe
LdB	Landisburg silt loam, gently sloping phase (tasso)	4.5	1.6%	Ile
Lo	Lindside silt loam, local alluvium phase	3.5	1.3%	IIw
DeB	Dewey silt loam, 2 to 5 percent slopes	3.4	1.2%	Ile
Gr	Greendale silt loam	3.1	1.1%	I
MsC2	Minvale silt loam, eroded sloping phase	2.9	1.1%	IIIe
DgD3	Dewey silty clay loam, 12 to 20 percent slopes, severely eroded	2.8	1.0%	VIe
DnD3	Dunmore silty clay loam, 12 to 20 percent slopes, severely eroded	2.4	0.9%	VIe
HeC2	Hermitage silt loam, eroded sloping phase (etowah)	2.1	0.8%	IIIe
EtB	Etowah silt loam, 2 to 5 percent slopes	2	0.7%	Ile
Em	Emory silt loam	1.7	0.6%	I
HeB	Hermitage silt loam, gently sloping phase (etowah)	1.7	0.6%	Ile
DeC2	Dewey silty clay loam, eroded sloping phase	1.6	0.6%	IIIe
DmD2	Dunmore silt loam, 12 to 20 percent slopes, eroded	1.5	0.5%	IVe
Gc	Greendale cherty silt loam	1.3	0.5%	Ile
FdD3	Fullerton cherty silty clay loam, severely eroded moderately steep phase	1.2	0.4%	VIe
MrC2	Minvale cherty silt loam, eroded sloping phase	1.2	0.4%	IIIe
Nk	Newark silt loam	1.1	0.4%	IIw
FtD3	Fullerton silty clay loam, severely eroded moderately steep phase (dewey)	1.1	0.4%	VIe
DeD2	Dewey silty clay loam, eroded moderately steep phase	1	0.3%	IVe
LdC2	Landisburg silt loam, eroded sloping phase (tasso)	0.7	0.3%	IIIe
Gl	Gullied land, limestone materials	0.2	0.1%	
FsD	Fullerton silt loam, moderately steep phase (dewey)	0.1	0.0%	IVe
Em	Emory silt loam	0.1	0.0%	I

Include Soil Map Unit Descriptions next page.

Section 5. Soil and Risk Assessment Analysis

5.1. Soil Information

Field	Soil Survey	Map Unit	Soil Component Name	Surface Texture	Slope Range (%)	OM Range (%)	Bedrock Depth (in.)
T-1 F-5	123	FtD	Fullerton	GR-SIL	12-20%	0.5-2%	
T-1 F-6	123	FtC	Fullerton	GR-SIL	5-12%	0.5-2%	
T-1 F-7	105	FcD	Fullerton	GR-SIL	12-20%	0.5-2%	
T-1 F-8	123	FtC	Fullerton	GR-SIL	5-12%	0.5-2%	
T-1 F-10	123	FtD	Fullerton	GR-SIL	12-20%	0.5-2%	
T-1 F-13	123	FtD	Fullerton	GR-SIL	12-20%	0.5-2%	
T-1 F-14	123	EtC	Etowah	SIL	5-12%	1-3%	
T-1 F-15	105	FcD	Fullerton	GR-SIL	12-20%	0.5-2%	
T-1 F-16	123	FtC	Fullerton	GR-SIL	5-12%	0.5-2%	
T-1 F-27	123	FtD	Fullerton	GR-SIL	12-20%	0.5-2%	
T-1 F-28	105	BoD2	Bolton	SIL	12-20%	1-3%	
T-1 F-33	123	FtD	Fullerton	GR-SIL	12-20%	0.5-2%	
T-7059 F-2	123	FtD	Fullerton	GR-SIL	12-20%	0.5-2%	
T-7059 F-3	123	DmC	Dunmore	SIL	5-12%	0.5-2%	
T-7059 F-6	123	FtC	Fullerton	GR-SIL	5-12%	0.5-2%	
T-7179 F-1	123	MnB	Minvale	SIL	2-5%	0.5-2%	
T-7179 F-2	123	FtD	Fullerton	GR-SIL	12-20%	0.5-2%	

5.2. Predicted Soil Erosion

Field	Predominant Soil Type	Slope (%)	Plan Avg. Soil Loss (Ton/Ac/Yr)
T-1 F-5	FtD (Fullerton GR-SIL)	10.0	0.5
T-1 F-6	FtC (Fullerton GR-SIL)	5.0	0.3
T-1 F-7	FcD (Fullerton GR-SIL)	10.0	2.1
T-1 F-8	FtC (Fullerton GR-SIL)	5.0	3.8
T-1 F-10	FtD (Fullerton GR-SIL)	10.0	.10
T-1 F-13	FtD (Fullerton GR-SIL)	10.0	2.0
T-1 F-14	EtC (Etowah SIL)	5.0	4.8
T-1 F-15	FcD (Fullerton GR-SIL)	8.0	5.0
T-1 F-16	FtC (Fullerton GR-SIL)	5.0	3.0
T-1 F-27	FtD (Fullerton GR-SIL)	10.0	4.3
T-1 F-28	BoD2 (Bolton SIL)	10.0	4.7
T-1 F-33	FtD (Fullerton GR-SIL)	10.0	4.1
T-7059 F-2	FtD (Fullerton GR-SIL)	10.0	2.1
T-7059 F-3	DmC (Dunmore SIL)	5.0	1.8
T-7059 F-6	FtC (Fullerton GR-SIL)	5.0	1.6
T-7179 F-1	MnB (Minvale SIL)	3.0	4.0
T-7179 F-2	FtD (Fullerton GR-SIL)	10.0	0.3

5.3. Nitrogen and Phosphorus Risk Analysis

Tennessee Phosphorus Index

The Tennessee Phosphorus (P) index was used to determine the potential for phosphorus transport off the fields. Considering all of the parameters that go into calculating the Phosphorus Index, Table 9 (next page), summarizes the P-Index for each field. Planned manure applications will not have a significant impact on the P-Index in the fields in this NMP unless exceeding the maximum rates listed on Table 9. All fields have P-Indexes rated MEDIUM at the indicated application rates for P2O5.

While soil test P is not the only factor affecting Phosphorus environmental risks, this plan does consider that soil P levels are very high for several of the application fields. The plan recommends that P2O5 applications for Field 'G' be discontinued so that P concentration in the soil will be reduced over time. Also for all other fields P2O5 applications should be limited to removal rates so that soil P values do not continue to increase for fields that are in the high to very high range for Phosphorus.

Environmental Considerations for Managing Phosphorus:

Phosphorus (P) loading to surface water can accelerate Eutrophication. The availability of other nutrients and light penetration into the water column will also influence the response of water bodies to phosphorus. Factors such as: the amount of erosion and runoff, the form, amount, and distribution of phosphorus in the soil: and fertilizer and manure application rate, timing and placement determine P loss from agricultural fields and the resulting P loading to water resources. Most phosphorus compounds found in soils have low water solubility. Consequently, P loss from agricultural land was once thought to be primarily associated with soil erosion. In many cases, sediment-bound P is still the dominant form in which P losses from agricultural fields occur. Over the past decade, research has shown that phosphorus can be lost in runoff in dissolved forms. High dissolved P concentration in runoff is more frequently observed where soil P levels are high particularly near the soil surface. High soil P levels, however, do not automatically equate to high dissolved P in runoff. As stated earlier, numerous factors interact to create the potential for P losses from agricultural fields. Many of the basis processes that govern P transport are known.

The Tennessee P Index rates the application fields based on the following factors:

- Soil Test P
- P2O5 application rate (all sources)
- Form of Phosphorus applied
- Timing of Phosphorus applications
- Method of application
- Hydrological group rating of the soils in the application field.
- Buffer and Setback widths, slopes % and length, vegetative cover, and soil texture

According to the NRCS nutrient management standard, fields ranked in the MEDIUM risk category may receive organic (manure) or inorganic (commercial fertilizer) applications at nitrogen-based rates per the table below.

<i>Total Points from P Index</i>	<i>Generalized Interpretation of P Index Points for the Site</i>
< 100	LOW potential for P movement from the field. If farming practices are maintained at the current level there is a low probability of an adverse impact to surface waters from P losses. Nitrogen-based nutrient management planning is satisfactory for this site. Soil P levels and P loss potential may increase in the future due to N-based nutrient management.
100 - 200	MEDIUM potential for P movement from the field. The chance for adverse impact to surface waters exists. <i>Nitrogen-based nutrient management planning may be satisfactory for this field when conservation measures are implemented to lessen the probability of P loss.</i> Soil P levels and P loss potential may increase in the future due to N-based nutrient management.
201 - 300	HIGH potential for P movement from the field. The chance for adverse impact to surface waters is likely unless remedial action is taken. Soil and water conservation practices are necessary (if practical) to reduce the risk of P movement and water quality degradation. If risk cannot be reduced, then a P-based nutrient management plan will be implemented.
> 301	VERY HIGH potential for P movement from the field and an adverse impact on surface waters. All necessary soil and water conservation practices, plus a P-based nutrient management plan must be put in place to avoid the potential for water quality degradation.

Tennessee Phosphorus Index

Field	Crop Year	Site & Transport Factor	Mgt & Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
T-1 F-5	2012	6	4	24	24	Low
T-1 F-5	2013	6	21	24	126	Medium
T-1 F-5	2014	6	21	24	126	Medium
T-1 F-5	2015	6	21	24	126	Medium
T-1 F-5	2016	6	21	24	126	Medium
T-1 F-6	2012	6	4	24	24	Low
T-1 F-6	2013	6	29	24	174	Medium
T-1 F-6	2014	6	21	24	126	Medium
T-1 F-6	2015	6	21	24	126	Medium
T-1 F-6	2016	6	21	24	126	Medium
T-1 F-7	2012	8	8	64	64	Low
T-1 F-7	2013	8	16	64	128	Medium
T-1 F-7	2014	8	20	64	160	Medium
T-1 F-7	2015	8	16	64	128	Medium
T-1 F-7	2016	8	16	64	128	Medium
T-1 F-8	2012	8	8	64	64	Low
T-1 F-8	2013	8	16	64	128	Medium
T-1 F-8	2014	8	20	64	160	Medium
T-1 F-8	2015	8	16	64	128	Medium
T-1 F-8	2016	8	16	64	128	Medium
T-1 F-10	2012	6	14	6	84	Low
T-1 F-10	2013	6	16	6	96	Low
T-1 F-10	2014	6	16	6	96	Low
T-1 F-10	2015	6	16	6	96	Low
T-1 F-10	2016	6	16	6	96	Low
T-1 F-13	2012	8	16	32	128	Medium
T-1 F-13	2013	8	12	32	96	Low
T-1 F-13	2014	8	25	32	200	Medium
T-1 F-13	2015	8	4	32	32	Low
T-1 F-13	2016	8	14	32	112	Medium
T-1 F-14	2012	8	10	32	80	Low
T-1 F-14	2013	8	10	32	80	Low
T-1 F-14	2014	8	10	32	80	Low
T-1 F-14	2015	8	18	32	144	Medium
T-1 F-14	2016	8	22	32	176	Medium
T-1 F-15	2012	8	10	32	80	Low
T-1 F-15	2013	8	10	32	80	Low
T-1 F-15	2014	8	10	32	80	Low
T-1 F-15	2015	8	10	32	80	Low
T-1 F-15	2016	8	16	32	128	Medium
T-1 F-16	2012	8	16	32	128	Medium
T-1 F-16	2013	8	12	32	96	Low

Field	Crop Year	Site & Transport Factor	Mgt & Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
T-1 F-16	2014	8	14	32	112	Medium
T-1 F-16	2015	8	14	32	112	Medium
T-1 F-16	2016	8	14	32	112	Medium
T-1 F-27	2012	8	4	32	32	Low
T-1 F-27	2013	8	12	32	96	Low
T-1 F-27	2014	8	12	32	96	Low
T-1 F-27	2015	8	16	32	128	Medium
T-1 F-27	2016	8	12	32	96	Low
T-1 F-28	2012	8	14	16	112	Medium
T-1 F-28	2013	8	10	16	80	Low
T-1 F-28	2014	8	12	16	96	Low
T-1 F-28	2015	8	12	16	96	Low
T-1 F-28	2016	8	12	16	96	Low
T-1 F-33	2012	8	4	32	32	Low
T-1 F-33	2013	8	12	32	96	Low
T-1 F-33	2014	8	12	32	96	Low
T-1 F-33	2015	8	16	32	128	Medium
T-1 F-33	2016	8	16	32	128	Medium
T-7059 F-2	2012	8	22	32	176	Medium
T-7059 F-2	2013	8	15	32	120	Medium
T-7059 F-2	2014	8	16	32	128	Medium
T-7059 F-2	2015	8	16	32	128	Medium
T-7059 F-2	2016	8	18	32	144	Medium
T-7059 F-3	2012	8	22	32	176	Medium
T-7059 F-3	2013	8	15	32	120	Medium
T-7059 F-3	2014	8	16	32	128	Medium
T-7059 F-3	2015	8	16	32	128	Medium
T-7059 F-3	2016	8	16	32	128	Medium
T-7059 F-6	2012	8	22	32	176	Medium
T-7059 F-6	2013	8	15	32	120	Medium
T-7059 F-6	2014	8	16	32	128	Medium
T-7059 F-6	2015	8	16	32	128	Medium
T-7059 F-6	2016	8	18	32	144	Medium
T-7179 F-1	2012	6	10	24	60	Low
T-7179 F-1	2013	6	10	24	60	Low
T-7179 F-1	2014	6	10	24	60	Low
T-7179 F-1	2015	6	19	24	114	Medium
T-7179 F-1	2016	6	22	24	132	Medium
T-7179 F-2	2012	6	4	24	24	Low
T-7179 F-2	2013	6	4	24	24	Low
T-7179 F-2	2014	6	24	24	144	Medium
T-7179 F-2	2015	6	24	24	144	Medium
T-7179 F-2	2016	6	24	24	144	Medium

5.4. Additional Field Data Required by Risk Assessment Procedure

Field	Distance to Water (Feet)	Slope Length (Feet)	Buffer Width (Feet)	Tillage/Cover Type
T-1 F-5	175	100	40	Pasture/Hay
T-1 F-6	150	100	40	Pasture/Hay
T-1 F-7	600	100	40	No-till w/ light to medium residues
T-1 F-8	425	100	40	No-till w/ light to medium residues
T-1 F-10	250	100	40	Pasture/Hay
T-1 F-13	425	100	40	No-till w/ light to medium residues
T-1 F-14	175	75	40	No-till w/ light to medium residues
T-1 F-15	675	75	40	No-till w/ light to medium residues
T-1 F-16	875	100	40	No-till w/ light to medium residues
T-1 F-27	1,425	100	40	No-till w/ light to medium residues
T-1 F-28	1,050	100	40	No-till w/ light to medium residues
T-1 F-33	1,100	100	40	No-till w/ light to medium residues
T-7059 F-2	1,350	100	40	No-till w/ light to medium residues
T-7059 F-3	400	100	40	No-till w/ light to medium residues
T-7059 F-6	300	100	40	No-till w/ light to medium residues
T-7179 F-1	275	100	40	No-till w/ light to medium residues
T-7179 F-2	325	100	40	Pasture/Hay

Nitrogen Leaching Risk Assessment and Nitrogen Management:

Nitrogen Leaching potential was assessed for all the fields in this CNMP using the nationally accepted "Colorado Nitrogen Leaching Index Risk Assessment" tool.

The results are listed in a table on the following page. All of the fields have LOW ratings under the planned management for crops grown and nitrogen sources applied.

Permeability Class, irrigation methods and efficiencies, Manure effluent application rates, application timing and mitigating practices implemented were factors considered to make this determination.

The following practices are additional recommendations as part of an overall nutrient management plan to reduce nitrogen losses to groundwater by leaching.

1. Set realistic yield goals and consider University of Tennessee nitrogen recommendations for crops grown.
2. Properly sample lagoon effluent applied to determine actual Nitrogen and other plant nutrients being applied.
3. Apply nitrogen in split applications during the growing season to reduce leaching losses and improve plant utilization of nitrogen by supplying N nearer to the times when the plants need the most nitrogen, at green up in the spring and after hay harvests throughout the summer.
4. Take credit for nitrogen from **all** sources: previously grown legume crops, nitrogen contained in any fertilizer products applied, manure applications, etc.
5. Conduct a post-harvest evaluation of the nitrogen program:
 - Compare actual yields vs. yield goal;
 - Evaluate factors affecting yields and nitrogen use efficiency;
 - Consider using plant tissue sampling and nitrate tests to evaluate plant nitrogen sufficiency;
 - Refine nitrogen rates for future years.
6. Consider taking some deep soil tests in the spring to determine nitrogen availability & movement in the soil.
7. Review each nutrient management plan annually to determine if changes in the nutrient budget are needed.
8. Calibrate application equipment annually, at minimum, to ensure uniform distribution of material at planned rates.
9. Avoid applying nitrogen around environmentally sensitive areas such as sinkholes, wells, gullies, ditches, surface inlets, or rapidly permeable areas.
10. Observe all manure and effluent application setbacks and/of buffers for irrigation and other manures or compost applications.

NRCS National - Nitrogen Leaching Tool

Nitrogen Leaching Index Risk Assessment (Version 2.0)

Factor	Low (1)	Medium (2)	High (3)	Very High (4)	Score
1. Permeability Class	Very slow, slow, and mod slow	Moderate	Moderately rapid	Rapid and very rapid	2
2. Irrigation Application Efficiency	High >85%	Moderate 60-85%	Moderately Low 35 – 60%	Low , 35%	0
3a. Nitrogen Application Rate (commercial N fertilizer with or without manure)	Total N application below agronomic rate	Total N application rate equal to agronomic rate	Total N application rate is 1 to 50 lbs/acre above agronomic rate	Total N application rate is > 50 lbs/acre above agronomic rate	2
3b. Manure Effluent Application Rate (no commercial N fertilizer)	Applied at P agronomic rate	Applied at N agronomic rate	Applied above N agronomic rate	Applied above N agronomic rate more than one consecutive year.	2
4. Application Timing	In season split application (2 or more splits)	Any nitrogen application 0-3 months before crop planting	Any nitrogen application 3-5 months before crop planting	Any nitrogen application more than 5 months before crop planting	1
GROSS SCORE (Sum of 1 thru 4)					7
5. Best Management Practice (BMP) Implementation Credits: Subtract 1 point for each of the following BMP's implemented in the field: < <u>Slow Release Fertilizers</u> >; < <u>Cover Crops</u> >; < <u>Nitrification Inhibitors*</u> >; < <u>Deep Rooted Crops in Rotation</u> >; < <u>Deep Soil Sampling to determine sub-soil N credit</u> >;					
Net Score; (Sum of factors 1 thru 4 minus factor 5, BMP credits)					5

Net Score	Risk Interpretations
< 8	This field has a LOW risk for nitrogen leaching if management is maintained at the current level. If there is an underlying aquifer that is shallow (< 20 ft) or used locally as a public drinking water source, increase the risk to MEDIUM .
8 to 11	This field has a MEDIUM risk for nitrogen leaching and some management changes may be needed to decrease risk. Apply nitrogen at agronomic rates or lower using spring or split in-season applications. If there is an underlying aquifer that is shallow (< 20 ft) or used locally as a public drinking water source, increase the risk to HIGH .
12 to 15	This field has a High-risk for nitrogen leaching and management changes should be implemented to decrease risk. Manure should be applied at P agronomic rates. Apply nitrogen using split in-season applications at or below the agronomic rate. Changes in irrigation management and/or method may also be necessary. If there is an underlying aquifer that is shallow (< 20 ft) or used locally as a public drinking water source, increase the risk to VERY HIGH .
16	This field has a VERY High-risk for nitrogen leaching and management changes are needed to decrease risk. Manure applications are NOT recommended . Apply nitrogen using split in-season applications at or below the agronomic rate. Changes in irrigation management and/or method are necessary to protect ground water. Implement all appropriate BMPs.

Section 6. Nutrient Management

6.1. Field Information

Field ID	Sub-field ID	Total Acres	Spread - able Acres	FSA Farm	FSA Tract	FSA Field	County	Predominant Soil Type	Slope (%)
T-1 F-5		7.0	7.0		1		Monroe	FtD (Fullerton GR-SIL)	10.0
T-1 F-6		3.8	3.3		1		Monroe	FtC (Fullerton GR-SIL)	5.0
T-1 F-7		21.1	19.7		1		Loudon	FcD (Fullerton GR-SIL)	10.0
T-1 F-8		8.1	8.1		1		Monroe	FtC (Fullerton GR-SIL)	5.0
T-1 F-10		4.3	4.3		1		Monroe	FtD (Fullerton GR-SIL)	10.0
T-1 F-13		12.0	11.6		1		Monroe	FtD (Fullerton GR-SIL)	10.0
T-1 F-14		6.0	4.7		1		Monroe	EtC (Etowah SIL)	5.0
T-1 F-15		23.2	22.6		1		Loudon	FcD (Fullerton GR-SIL)	8.0
T-1 F-16		18.8	16.2		1		Monroe	FtC (Fullerton GR-SIL)	5.0
T-1 F-27		32.7	31.8		1		Monroe	FtD (Fullerton GR-SIL)	10.0
T-1 F-28		16.4	16.4		1		Loudon	BoD2 (Bolton SIL)	10.0
T-1 F-33		18.3	17.2		1		Monroe	FtD (Fullerton GR-SIL)	10.0
T-7059 F-2		19.2	19.2		7059		Monroe	FtD (Fullerton GR-SIL)	10.0
T-7059 F-3		29.5	28.6		7059		Monroe	DmC (Dunmore SIL)	5.0
T-7059 F-6		11.6	10.8		7059		Monroe	FtC (Fullerton GR-SIL)	5.0
T-7179 F-1		8.8	7.8		7179		Monroe	MnB (Minvale SIL)	3.0
T-7179 F-2		6.5	6.0		7179		Monroe	FtD (Fullerton GR-SIL)	10.0
Total Acres		247.3	235.3						

OVERVIEW:

This Nutrient Management Plan conforms to the Tennessee NRCS 590 Standard Practice

P1, Phosphorus:

Soil Sample results indicated that fields range from Low to Very High for soil P. Over time the manure applications recommended are expected to build soil P slightly for most fields, but planned to be limited to a P replacement rate for fields that are highest in Phosphorus. Planned applications will not increase the P risk significantly. (The Phosphorus Index, a measure of risk of phosphorus pollution, is rated Low to Medium for all fields that are planned to receive manure)

K, Potassium:

Soil Sample results indicated that fields range from Low to Optimum for soil Potassium (K) Over time the manure applications recommended are expected to maintain soil K or increase towards optimum levels. Hay & silage removes large amounts of potassium from the soil and manure applications are a good way to add potassium back to the soil.

pH: For maximum yields and soil fertility, it is recommended to maintain a soil pH of at least 6.0 for corn & small grains rotations. If pH is less than 6.0, liming material should be applied at U or I recommended rates based on the CCE (Calcium Carbonate Equivalent) rating and the fineness of the limestone material. If alfalfa or clover is part of the rotation pH should be maintained between 6.5 and 7.0.

All fields currently are within the optimal range for planned crop rotations with the exception of **Fields T1-5, T1-6 and T1-13.** Lime is recommended to be applied at **2 tons per acre** for these fields.

Fields should be retested at least 6 months after lime is applied to re-evaluate pH.

Guidance in developing a nutrient budget may be obtained from your NRCS Field Office or your University of Tennessee Agricultural Extension Service Agent. Land application procedures must be planned and implemented in a way that minimizes potential adverse impacts to the environment and public health.

6.2. Manure Application Setback Distances

Setback Requirements: Class II CAFO

Feature	Setback Criteria	Setback Distance (Feet)
Streams	Applied upgradient, permanent vegetated setback ≥ 35 feet	35
Streams	New operation, near high quality stream	60
Surface waters	Applied upgradient, permanent vegetated setback ≥ 35 feet	35
Open tile line inlet structures	Applied upgradient, permanent vegetated setback ≥ 35 feet	35
Sinkholes	Applied upgradient, permanent vegetated setback ≥ 35 feet	35
Agricultural well heads	Applied upgradient, permanent vegetated setback ≥ 35 feet	35
Other conduits to surface waters	Applied upgradient, permanent vegetated setback ≥ 35 feet	35
Potable well, public or private	Application upgradient of feature	300
Potable well, public or private	Application down-gradient of feature	150

Source: TN DEQ Rule 1200-4-5-.14(17)(d) (<http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf>)

Setback Requirements: NRCS Standard

Feature	Setback Criteria	Setback Distance (Feet)
Well	Application upgradient of feature	300
Well	Application down-gradient of feature	150
Waterbody	Predominant slope $< 5\%$ with good vegetation	30
Waterbody	Predominant slope 5 to 8% with good vegetation	50
Waterbody	Predominant slope $> 8\%$	100
Waterbody	Poor vegetation	100
Public road	All applications	50
Dwelling (other than producer)	All applications	300
Public use area	All applications	300
Property line	Application upgradient of feature	30

Source: Nutrient Management Standard 590
([http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_\(590\)_Standard.doc](http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc))

6.3. Soil Test Data

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Units	Soil pH	Buffer pH	CEC (meq/100g)
T-1 F-5	2011		Mehlich-1	104	228	223	1,601	lbs/a	5.9	7.6	5.2
T-1 F-6	2011		Mehlich-1	104	228	223	1,601	lbs/a	5.9	7.6	5.2
T-1 F-7	2009		Mehlich-1	287	238	493	2,654	lbs/a	6.7		
T-1 F-8	2009		Mehlich-1	287	238	493	2,654	lbs/a	6.7		
T-1 F-10	2011		Mehlich-1	30	189	300	1,473	lbs/a	6.0	7.6	5.2
T-1 F-13	2011		Mehlich-1	81	207	310	1,617	lbs/a	5.9		
T-1 F-14	2009		Mehlich-1	142	208	594	2,447	lbs/a	6.5		
T-1 F-15	2011		Mehlich-1	169	273	855	3,329	lbs/a	6.9		
T-1 F-16	2009		Mehlich-1	94	213	331	1,626	lbs/a	6.3		
T-1 F-27	2009		Mehlich-1	176	252	715	3,491	lbs/a	6.4		
T-1 F-28	2009		Mehlich-1	40	161	696	366	lbs/a	6.6		
T-1 F-33	2009		Mehlich-1	192	272	425	2,340	lbs/a	6.3		
T-7059 F-2	2009		Mehlich-1	163	210	674	2,945	lbs/a	6.7		
T-7059 F-3	2009		Mehlich-1	151	155	476	2,264	lbs/a	6.4		
T-7059 F-6	2009		Mehlich-1	148	188	698	2,697	lbs/a	6.7		
T-7179 F-1	2009		Mehlich-1	142	208	594	2,447	lbs/a	6.5		
T-7179 F-2	2009		Mehlich-1	142	208	594	2,447	lbs/a	6.5		

6.4. Manure Nutrient Analysis

Manure Source	Dry Matter (%)	Total N	NH ₄ -N	Total P ₂ O ₅	Total K ₂ O	Avail. P ₂ O ₅	Avail. K ₂ O	Units	Analysis Source and Date
Storage Pond	1.0	4.0	2.0	3.0	4.0	3.0	4.0	Lb/1000Gal	Dairy-Pond/Lagoon, MWPS-Pub-18, table 10-7
Manure pit	17.4	8.1	1.6	1.6	5.0	1.6	5.0	Lb/Ton	U of Arkansas 10/15/2009
Calf barns	50.0	6.0	1.2	2.3	2.7	2.3	2.7	Lb/Ton	MMP-estimate for bedded manure

(1) Entered analysis may be the average of several individual analyses.

(2) Tennessee assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Tennessee, see "Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94 (http://wastemgmt.ag.utk.edu/ExtensionProjects/extension_publications.htm).

6.5. Planned Crops and Fertilizer Recommendations

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
T-1 F-5	2012	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-5	2013	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-5	2014	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-5	2015	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-5	2016	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-6	2012	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-6	2013	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-6	2014	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-6	2015	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-6	2016	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-1 F-7	2012	Small grain cover*		0	0	0	0	0	0	
T-1 F-7	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-7	2013	Small grain cover*		0	0	0	0	0	0	
T-1 F-7	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-7	2014	Small grain cover*		0	0	0	0	0	0	
T-1 F-7	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-7	2015	Small grain cover*		0	0	0	0	0	0	
T-1 F-7	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-7	2016	Small grain cover*		0	0	0	0	0	0	
T-1 F-7	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-8	2012	Small grain cover*		0	0	0	0	0	0	
T-1 F-8	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-8	2013	Small grain cover*		0	0	0	0	0	0	
T-1 F-8	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-8	2014	Small grain cover*		0	0	0	0	0	0	
T-1 F-8	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-8	2015	Small grain cover*		0	0	0	0	0	0	
T-1 F-8	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-8	2016	Small grain cover*		0	0	0	0	0	0	
T-1 F-8	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
T-1 F-10	2012	Grass-clover hay maint	4.0 Ton	60	30	0	200	60	240	
T-1 F-10	2013	Grass-clover hay maint	4.0 Ton	60	30	0	200	60	240	
T-1 F-10	2014	Grass-clover hay maint	4.0 Ton	60	30	0	200	60	240	
T-1 F-10	2015	Grass-clover hay maint	4.0 Ton	60	30	0	200	60	240	
T-1 F-10	2016	Grass-clover hay maint	4.0 Ton	60	30	0	200	60	240	
T-1 F-13	2012	Small grain cover*		0	0	0	0	0	0	
T-1 F-13	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-13	2013	Small grain cover*		0	0	0	0	0	0	
T-1 F-13	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-13	2014	Small grain cover*		0	0	0	0	0	0	
T-1 F-13	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-13	2015	Small grain cover*		0	0	0	0	0	0	
T-1 F-13	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-13	2016	Small grain cover*		0	0	0	0	0	0	
T-1 F-13	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-14	2012	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-14	2012	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-14	2013	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-14	2013	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-14	2014	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-14	2014	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-14	2015	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-14	2015	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-14	2016	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-14	2016	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-15	2012	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-15	2012	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-15	2013	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-15	2013	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-15	2014	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-15	2014	Corn silage	25.0 Ton	150	0	0	208	90	208	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
T-1 F-15	2015	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-15	2015	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-15	2016	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-1 F-15	2016	Corn silage	25.0 Ton	150	0	0	208	90	208	
T-1 F-16	2012	Small grain cover*		0	0	0	0	0	0	
T-1 F-16	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-16	2013	Small grain cover*		0	0	0	0	0	0	
T-1 F-16	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-16	2014	Small grain cover*		0	0	0	0	0	0	
T-1 F-16	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-16	2015	Small grain cover*		0	0	0	0	0	0	
T-1 F-16	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-16	2016	Small grain cover*		0	0	0	0	0	0	
T-1 F-16	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-27	2012	Small grain cover*		0	0	0	0	0	0	
T-1 F-27	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-27	2013	Small grain cover*		0	0	0	0	0	0	
T-1 F-27	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-27	2014	Small grain cover*		0	0	0	0	0	0	
T-1 F-27	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-27	2015	Small grain cover*		0	0	0	0	0	0	
T-1 F-27	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-27	2016	Small grain cover*		0	0	0	0	0	0	
T-1 F-27	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-28	2012	Small grain cover*		0	0	0	0	0	0	
T-1 F-28	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-28	2013	Small grain cover*		0	0	0	0	0	0	
T-1 F-28	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-28	2014	Small grain cover*		0	0	0	0	0	0	
T-1 F-28	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-28	2015	Small grain cover*		0	0	0	0	0	0	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
T-1 F-28	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-28	2016	Small grain cover*		0	0	0	0	0	0	
T-1 F-28	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-33	2012	Small grain cover*		0	0	0	0	0	0	
T-1 F-33	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-33	2013	Small grain cover*		0	0	0	0	0	0	
T-1 F-33	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-33	2014	Small grain cover*		0	0	0	0	0	0	
T-1 F-33	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-33	2015	Small grain cover*		0	0	0	0	0	0	
T-1 F-33	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-1 F-33	2016	Small grain cover*		0	0	0	0	0	0	
T-1 F-33	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-2	2012	Small grain cover*		0	0	0	0	0	0	
T-7059 F-2	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-2	2013	Small grain cover*		0	0	0	0	0	0	
T-7059 F-2	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-2	2014	Small grain cover*		0	0	0	0	0	0	
T-7059 F-2	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-2	2015	Small grain cover*		0	0	0	0	0	0	
T-7059 F-2	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-2	2016	Small grain cover*		0	0	0	0	0	0	
T-7059 F-2	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-3	2012	Small grain cover*		0	0	0	0	0	0	
T-7059 F-3	2012	Corn silage	24.0 Ton	150	0	160	199	86	199	
T-7059 F-3	2013	Small grain cover*		0	0	0	0	0	0	
T-7059 F-3	2013	Corn silage	24.0 Ton	150	0	160	199	86	199	
T-7059 F-3	2014	Small grain cover*		0	0	0	0	0	0	
T-7059 F-3	2014	Corn silage	24.0 Ton	150	0	160	199	86	199	
T-7059 F-3	2015	Small grain cover*		0	0	0	0	0	0	
T-7059 F-3	2015	Corn silage	24.0 Ton	150	0	160	199	86	199	

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)	Custom Fert. Rec. Source
T-7059 F-3	2016	Small grain cover*		0	0	0	0	0	0	
T-7059 F-3	2016	Corn silage	24.0 Ton	150	0	160	199	86	199	
T-7059 F-6	2012	Small grain cover*		0	0	0	0	0	0	
T-7059 F-6	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-6	2013	Small grain cover*		0	0	0	0	0	0	
T-7059 F-6	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-6	2014	Small grain cover*		0	0	0	0	0	0	
T-7059 F-6	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-6	2015	Small grain cover*		0	0	0	0	0	0	
T-7059 F-6	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7059 F-6	2016	Small grain cover*		0	0	0	0	0	0	
T-7059 F-6	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7179 F-1	2012	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-7179 F-1	2012	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7179 F-1	2013	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-7179 F-1	2013	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7179 F-1	2014	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-7179 F-1	2014	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7179 F-1	2015	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-7179 F-1	2015	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7179 F-1	2016	Sm grain spring hay*	5.0 Ton	105	0	0	125	35	155	
T-7179 F-1	2016	Corn silage	24.0 Ton	150	0	0	199	86	199	
T-7179 F-2	2012	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-7179 F-2	2013	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-7179 F-2	2014	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-7179 F-2	2015	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	
T-7179 F-2	2016	Grass-clover hay maint	4.0 Ton	60	0	0	200	60	240	

*first crop in double-crop system-(hay=silage for planning purposes.).

^a Custom fertilizer recommendation.

6.6. Manure Application Planning Calendar – October 2011 through September 2012

Field	Total Acres	Spread Acres	Predominant Soil Type	Primary 2012 Crop (Prev. Primary Crop)	Oct '11	Nov '11	Dec '11	Jan '12	Feb '12	Mar '12	Apr '12	May '12	Jun '12	Jul '12	Aug '12	Sep '12
T-1 F-5	7.0	7.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)												
T-1 F-6	3.8	3.3	Fullerton GR-SIL (FtC 5-12%)	Grass-clover hay maint (Grass-clover hay maint)												
T-1 F-7	21.1	19.7	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)												X
T-1 F-8	8.1	8.1	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												X
T-1 F-10	4.3	4.3	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)	5.4					8.6						
T-1 F-13	12.0	11.6	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)							17.5					X
T-1 F-14	6.0	4.7	Etowah SIL (EtC 5-12%)	Corn silage (Corn silage)								7.1				
T-1 F-15	23.2	22.6	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)												
T-1 F-16	18.8	16.2	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												X
T-1 F-27	32.7	31.8	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												X
T-1 F-28	16.4	16.4	Bolton SIL (BoD2 12-20%)	Corn silage (Corn silage)												X
T-1 F-33	18.3	17.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												X
T-7059 F-2	19.2	19.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												28.9
T-7059 F-3	29.5	28.6	Dunmore SIL (DmC 5-12%)	Corn silage (Corn silage)												42.9
T-7059 F-6	11.6	10.8	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)										19.2		16.2
T-7179 F-1	8.8	7.8	Minvale SIL (MnB 2-5%)	Corn silage (Corn silage)										42.9		
T-7179 F-2	6.5	6.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)										10.8		
Total	247.3	235.3			5.4				72.9	8.6	66.5	52.8				88.0 X
Crop in field				No. indicates total loads "X" indicates other manure apps												

Manure Application Planning Calendar – October 2012 through September 2013

Field	Total Acres	Spread Acres	Predominant Soil Type	Primary 2013 Crop (Prev. Primary Crop)	Oct '12	Nov '12	Dec '12	Jan '13	Feb '13	Mar '13	Apr '13	May '13	Jun '13	Jul '13	Aug '13	Sep '13
T-1 F-5	7.0	7.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)										X		
T-1 F-6	3.8	3.3	Fullerton GR-SIL (FtC 5-12%)	Grass-clover hay maint (Grass-clover hay maint)										X		
T-1 F-7	21.1	19.7	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)												
T-1 F-8	8.1	8.1	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												
T-1 F-10	4.3	4.3	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)	10.8								10.8			
T-1 F-13	12.0	11.6	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												X
T-1 F-14	6.0	4.7	Etowah SIL (EtC 5-12%)	Corn silage (Corn silage)								7.1				
T-1 F-15	23.2	22.6	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)								33.9				
T-1 F-16	18.8	16.2	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												X
T-1 F-27	32.7	31.8	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												X
T-1 F-28	16.4	16.4	Bolton SIL (BoD2 12-20%)	Corn silage (Corn silage)												X
T-1 F-33	18.3	17.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												X
T-7059 F-2	19.2	19.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												
T-7059 F-3	29.5	28.6	Dunmore SIL (DmC 5-12%)	Corn silage (Corn silage)												
T-7059 F-6	11.6	10.8	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												
T-7179 F-1	8.8	7.8	Minvale SIL (MnB 2-5%)	Corn silage (Corn silage)								11.8				
T-7179 F-2	6.5	6.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)												
Total	247.3	235.3			10.8							52.8	10.8	X		X
Crop in field				No. indicates total loads "X" indicates other manure apps												

Manure Application Planning Calendar – October 2013 through September 2014

Field	Total Acres	Spread Acres	Predominant Soil Type	Primary 2014 Crop (Prev. Primary Crop)	Oct '13	Nov '13	Dec '13	Jan '14	Feb '14	Mar '14	Apr '14	May '14	Jun '14	Jul '14	Aug '14	Sep '14
T-1 F-5	7.0	7.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)										X		
T-1 F-6	3.8	3.3	Fullerton GR-SIL (FtC 5-12%)	Grass-clover hay maint (Grass-clover hay maint)										X		
T-1 F-7	21.1	19.7	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)							29.6					X
T-1 F-8	8.1	8.1	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)							12.2					X
T-1 F-10	4.3	4.3	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)	10.4								10.8			
T-1 F-13	12.0	11.6	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)							17.5					
T-1 F-14	6.0	4.7	Etowah SIL (EtC 5-12%)	Corn silage (Corn silage)								7.1				X
T-1 F-15	23.2	22.6	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)								33.9				
T-1 F-16	18.8	16.2	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												X
T-1 F-27	32.7	31.8	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												
T-1 F-28	16.4	16.4	Bolton SIL (BoD2 12-20%)	Corn silage (Corn silage)												X
T-1 F-33	18.3	17.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												
T-7059 F-2	19.2	19.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)	28.9											
T-7059 F-3	29.5	28.6	Dunmore SIL (DmC 5-12%)	Corn silage (Corn silage)	42.9											
T-7059 F-6	11.6	10.8	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)	16.2											
T-7179 F-1	8.8	7.8	Minvale SIL (MnB 2-5%)	Corn silage (Corn silage)								11.8				X
T-7179 F-2	6.5	6.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)	9.0									X		
Total	247.3	235.3			107.4						59.3	52.8	10.8	X		X
Crop in field				No. indicates total loads "X" indicates other manure apps												

Manure Application Planning Calendar – October 2014 through September 2015

Field	Total Acres	Spread. Acres	Predominant Soil Type	Primary 2015 Crop (Prev. Primary Crop)	Oct '14	Nov '14	Dec '14	Jan '15	Feb '15	Mar '15	Apr '15	May '15	Jun '15	Jul '15	Aug '15	Sep '15
T-1 F-5	7.0	7.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)										X		
T-1 F-6	3.8	3.3	Fullerton GR-SIL (FtC 5-12%)	Grass-clover hay maint (Grass-clover hay maint)										X		
T-1 F-7	21.1	19.7	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)												X
T-1 F-8	8.1	8.1	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												X
T-1 F-10	4.3	4.3	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)		10.8							10.8			
T-1 F-13	12.0	11.6	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												X
T-1 F-14	6.0	4.7	Etowah SIL (EtC 5-12%)	Corn silage (Corn silage)								7.1				X
T-1 F-15	23.2	22.6	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)								33.9				
T-1 F-16	18.8	16.2	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												X
T-1 F-27	32.7	31.8	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)	47.7											X
T-1 F-28	16.4	16.4	Bolton SIL (BoD2 12-20%)	Corn silage (Corn silage)												X
T-1 F-33	18.3	17.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)	25.9											
T-7059 F-2	19.2	19.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)							28.9					
T-7059 F-3	29.5	28.6	Dunmore SIL (DmC 5-12%)	Corn silage (Corn silage)							42.9					
T-7059 F-6	11.6	10.8	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)							16.2					
T-7179 F-1	8.8	7.8	Minvale SIL (MnB 2-5%)	Corn silage (Corn silage)								11.8				X
T-7179 F-2	6.5	6.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)	9.0									X		
Total	247.3	235.3			82.6	10.8					88.0	52.8	10.8	X		X
Crop in field				No. indicates total loads "X" indicates other manure apps												

Manure Application Planning Calendar – October 2015 through September 2016

Field	Total Acres	Spread Acres	Predominant Soil Type	Primary 2016 Crop (Prev. Primary Crop)	Oct '15	Nov '15	Dec '15	Jan '16	Feb '16	Mar '16	Apr '16	May '16	Jun '16	Jul '16	Aug '16	Sep '16
T-1 F-5	7.0	7.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)										X		
T-1 F-6	3.8	3.3	Fullerton GR-SIL (FtC 5-12%)	Grass-clover hay maint (Grass-clover hay maint)										X		
T-1 F-7	21.1	19.7	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)												
T-1 F-8	8.1	8.1	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												
T-1 F-10	4.3	4.3	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)		10.8							10.8			
T-1 F-13	12.0	11.6	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												
T-1 F-14	6.0	4.7	Etowah SIL (EtC 5-12%)	Corn silage (Corn silage)								7.1				
T-1 F-15	23.2	22.6	Fullerton GR-SIL (FcD 12-20%)	Corn silage (Corn silage)								33.9				
T-1 F-16	18.8	16.2	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)												
T-1 F-27	32.7	31.8	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)												
T-1 F-28	16.4	16.4	Bolton SIL (BoD2 12-20%)	Corn silage (Corn silage)												
T-1 F-33	18.3	17.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)								25.9				
T-7059 F-2	19.2	19.2	Fullerton GR-SIL (FtD 12-20%)	Corn silage (Corn silage)						28.9						
T-7059 F-3	29.5	28.6	Dunmore SIL (DmC 5-12%)	Corn silage (Corn silage)							42.9					
T-7059 F-6	11.6	10.8	Fullerton GR-SIL (FtC 5-12%)	Corn silage (Corn silage)						16.2						
T-7179 F-1	8.8	7.8	Minvale SIL (MnB 2-5%)	Corn silage (Corn silage)								11.8				
T-7179 F-2	6.5	6.0	Fullerton GR-SIL (FtD 12-20%)	Grass-clover hay maint (Grass-clover hay maint)	9.0									X		
Total	247.3	235.3			9.0	10.8				45.1	42.9	78.7	10.8	X		
Crop in field				No. indicates total loads "X" indicates other manure apps												

6.7. Planned Nutrient Applications (Manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
T-1 F-5	Jul 2013	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	189,000 Gal	7.0	49	81	108
T-1 F-5	Jul 2014	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	189,000 Gal	7.0	49	81	108
T-1 F-5	Jul 2015	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	189,000 Gal	7.0	49	81	108
T-1 F-5	Jul 2016	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	189,000 Gal	7.0	49	81	108
T-1 F-6	Jul 2013	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	89,100 Gal	3.3	49	81	108
T-1 F-6	Jul 2013	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	89,100 Gal	3.3	49	81	108
T-1 F-6	Jul 2014	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	89,100 Gal	3.3	49	81	108
T-1 F-6	Jul 2015	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	89,100 Gal	3.3	49	81	108
T-1 F-6	Jul 2016	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	89,100 Gal	3.3	49	81	108
T-1 F-7	Sep 2012	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	394,000 Gal	19.7	56	60	80
T-1 F-7	Apr 2014	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	29.6 Lds	296 Ton	19.7	48	24	75
T-1 F-7	Sep 2014	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	394,000 Gal	19.7	56	60	80
T-1 F-7	Sep 2015	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	394,000 Gal	19.7	56	60	80
T-1 F-7	Sep 2016	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	394,000 Gal	19.7	56	60	80
T-1 F-8	Sep 2012	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	162,000 Gal	8.1	56	60	80
T-1 F-8	Apr 2014	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	12.2 Lds	122 Ton	8.1	48	24	75
T-1 F-8	Sep 2014	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	162,000 Gal	8.1	56	60	80
T-1 F-8	Sep 2015	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	162,000 Gal	8.1	56	60	80
T-1 F-8	Sep 2016	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	162,000 Gal	8.1	56	60	80
T-1 F-10	Oct 2011	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	5 Ton	5.4 Lds	21.6 Ton	4.3	12	12	14
T-1 F-10	Mar 2012	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	8 Ton	8.6 Lds	34.4 Ton	4.3	19	18	22
T-1 F-10	Oct 2012	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	10 Ton	10.8 Lds	43.2 Ton	4.3	24	23	27
T-1 F-10	Jun 2013	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	10 Ton	10.8 Lds	43.2 Ton	4.3	24	23	27
T-1 F-10	Oct 2013	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	10 Ton	10.4 Lds	41.6 Ton	4.2	24	23	27
T-1 F-10	Jun 2014	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	10 Ton	10.8 Lds	43 Ton	4.3	24	23	27
T-1 F-10	Nov 2014	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	10 Ton	10.8 Lds	43.2 Ton	4.3	24	23	27

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
T-1 F-10	Jun 2015	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	10 Ton	10.8 Lds	43.2 Ton	4.3	24	23	27
T-1 F-10	Nov 2015	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	10 Ton	10.8 Lds	43.2 Ton	4.3	24	23	27
T-1 F-10	Jun 2016	Grass-clover hay maint	Calf barns	Dry-spreader, Not incorporated	Custom	10 Ton	10.8 Lds	43.2 Ton	4.3	24	23	27
T-1 F-13	Apr 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	17.5 Lds	175 Ton	11.7	48	24	75
T-1 F-13	Sep 2012	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	232,000 Gal	11.6	56	60	80
T-1 F-13	Sep 2013	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	313,200 Gal	11.6	76	81	108
T-1 F-13	Apr 2014	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	17.5 Lds	175 Ton	11.7	48	24	75
T-1 F-13	Sep 2015	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	313,200 Gal	11.6	76	81	108
T-1 F-14	May 2012	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	7.1 Lds	71 Ton	4.7	48	24	75
T-1 F-14	May 2013	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	7.1 Lds	71 Ton	4.7	48	24	75
T-1 F-14	May 2014	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	7.1 Lds	71 Ton	4.7	48	24	75
T-1 F-14	Sep 2014	Sm grain spring hay	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	126,900 Gal	4.7	76	81	108
T-1 F-14	May 2015	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	7.1 Lds	71 Ton	4.7	48	24	75
T-1 F-14	Sep 2015	Sm grain spring hay	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	94,000 Gal	4.7	56	60	80
T-1 F-14	May 2016	Sm grain spring hay	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	7.1 Lds	71 Ton	4.7	48	24	75
T-1 F-14	Sep 2016	Sm grain spring hay	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	126,900 Gal	4.7	76	81	108
T-1 F-15	May 2012	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	33.9 Lds	339 Ton	22.6	48	24	75
T-1 F-15	May 2013	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	33.9 Lds	339 Ton	22.6	48	24	75
T-1 F-15	May 2014	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	33.9 Lds	339 Ton	22.6	48	24	75
T-1 F-15	May 2015	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	33.9 Lds	339 Ton	22.6	48	24	75
T-1 F-15	May 2016	Sm grain spring hay	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	33.9 Lds	339 Ton	22.6	48	24	75
T-1 F-16	Apr 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	24.4 Lds	244 Ton	16.3	48	24	75
T-1 F-16	Sep 2012	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	324,000 Gal	16.2	56	60	80
T-1 F-16	Sep 2013	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	437,400 Gal	16.2	76	81	108

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
T-1 F-16	Sep 2014	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	437,400 Gal	16.2	76	81	108
T-1 F-16	Sep 2015	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	437,400 Gal	16.2	76	81	108
T-1 F-16	Sep 2016	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	437,400 Gal	16.2	76	81	108
T-1 F-27	Sep 2012	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	636,000 Gal	31.8	56	60	80
T-1 F-27	Sep 2013	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	636,000 Gal	31.8	56	60	80
T-1 F-27	Oct 2014	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	47.7 Lds	477 Ton	31.8	48	24	75
T-1 F-27	Sep 2015	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	636,000 Gal	31.8	56	60	80
T-1 F-28	Apr 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	24.6 Lds	246 Ton	16.4	48	24	75
T-1 F-28	Sep 2012	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	328,000 Gal	16.4	56	60	80
T-1 F-28	Sep 2013	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	442,800 Gal	16.4	76	81	108
T-1 F-28	Sep 2014	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	442,800 Gal	16.4	76	81	108
T-1 F-28	Sep 2015	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	442,800 Gal	16.4	76	81	108
T-1 F-28	Sep 2016	Corn silage	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	442,800 Gal	16.4	76	81	108
T-1 F-33	Sep 2012	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	344,000 Gal	17.2	56	60	80
T-1 F-33	Sep 2013	Corn silage	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	344,000 Gal	17.2	56	60	80
T-1 F-33	Oct 2014	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	25.9 Lds	259 Ton	17.3	48	24	75
T-1 F-33	May 2016	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	25.9 Lds	259 Ton	17.3	48	24	75
T-7059 F-2	Feb 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	10 Ton	19.2 Lds	192 Ton	19.2	32	16	50
T-7059 F-2	Sep 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	28.9 Lds	289 Ton	19.3	48	24	75
T-7059 F-2	Oct 2013	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	28.9 Lds	289 Ton	19.3	48	24	75
T-7059 F-2	Apr 2015	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	28.9 Lds	289 Ton	19.3	48	24	75
T-7059 F-2	Mar 2016	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	28.9 Lds	289 Ton	19.3	48	24	75
T-7059 F-3	Feb 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	42.9 Lds	429 Ton	28.6	48	24	75
T-7059 F-3	Sep 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	42.9 Lds	429 Ton	28.6	48	24	75
T-7059 F-3	Oct 2013	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	42.9 Lds	429 Ton	28.6	48	24	75

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
T-7059 F-3	Apr 2015	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	42.9 Lds	429 Ton	28.6	48	24	75
T-7059 F-3	Apr 2016	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	42.9 Lds	429 Ton	28.6	48	24	75
T-7059 F-6	Feb 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	10 Ton	10.8 Lds	108 Ton	10.8	32	16	50
T-7059 F-6	Sep 2012	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	16.2 Lds	162 Ton	10.8	48	24	75
T-7059 F-6	Oct 2013	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	16.2 Lds	162 Ton	10.8	48	24	75
T-7059 F-6	Apr 2015	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	16.2 Lds	162 Ton	10.8	48	24	75
T-7059 F-6	Mar 2016	Corn silage	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	16.2 Lds	162 Ton	10.8	48	24	75
T-7179 F-1	May 2012	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	11.8 Lds	118 Ton	7.9	48	24	75
T-7179 F-1	May 2013	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	11.8 Lds	118 Ton	7.9	48	24	75
T-7179 F-1	May 2014	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	11.8 Lds	118 Ton	7.9	48	24	75
T-7179 F-1	Sep 2014	Sm grain spring hay	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	210,600 Gal	7.8	76	81	108
T-7179 F-1	May 2015	Sm grain spring hay	Manure pit	Slurry Spreader, incorp. w/in 1 day(s)	Custom	15 Ton	11.8 Lds	118 Ton	7.9	48	24	75
T-7179 F-1	Sep 2015	Sm grain spring hay	Storage Pond	Umbilical drag-hose	Custom	20,000 Gal	1.2 mph	156,000 Gal	7.8	56	60	80
T-7179 F-1	May 2016	Sm grain spring hay	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	11.8 Lds	118 Ton	7.9	48	24	75
T-7179 F-1	Sep 2016	Sm grain spring hay	Storage Pond	Umbilical drag-hose	Custom	27,000 Gal	0.9 mph	210,600 Gal	7.8	76	81	108
T-7179 F-2	Oct 2013	Grass-clover hay maint	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	9 Lds	90 Ton	6.0	48	24	75
T-7179 F-2	Jul 2014	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	162,000 Gal	6.0	49	81	108
T-7179 F-2	Oct 2014	Grass-clover hay maint	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	9 Lds	90 Ton	6.0	48	24	75
T-7179 F-2	Jul 2015	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	162,000 Gal	6.0	49	81	108
T-7179 F-2	Oct 2015	Grass-clover hay maint	Manure pit	Slurry Spreader, Not incorporated	Custom	15 Ton	9 Lds	90 Ton	6.0	48	24	75
T-7179 F-2	Jul 2016	Grass-clover hay maint	Storage Pond	Traveling gun	Custom	27,000 Gal	258 Ft/Hr	162,000 Gal	6.0	49	81	108

6.8. Field Nutrient Balance (Manure-spreadable Area)

Year	Field	Size Acres	Crop	Yield Goal /Acre	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2012	T-1 F-5	7.0	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2013	T-1 F-5	7.0	Grass-clover hay maint	4	60	0	0	49	81	108	-11	81	108	21	-132
2014	T-1 F-5	7.0	Grass-clover hay maint	4	60	0	0	49	81	108	-3†	162	216	42	-132
2015	T-1 F-5	7.0	Grass-clover hay maint	4	60	0	0	49	81	108	0†	243	324	63	-132
2016	T-1 F-5	7.0	Grass-clover hay maint	4	60	0	0	49	81	108	0†	324	432	84	-132
Total	T-1 F-5				300	0	0	196	324	432					
2012	T-1 F-6	3.3	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2013	T-1 F-6	3.3	Grass-clover hay maint	4	60	0	0	98	162	216	38	162	216	102	-24
2014	T-1 F-6	3.3	Grass-clover hay maint	4	60	0	0	49	81	108	5†	243	324	123	-132
2015	T-1 F-6	3.3	Grass-clover hay maint	4	60	0	0	49	81	108	3†	324	432	144	-132
2016	T-1 F-6	3.3	Grass-clover hay maint	4	60	0	0	49	81	108	0†	405	540	165	-132
Total	T-1 F-6				300	0	0	245	405	540					
2012	T-1 F-7	19.7	Small grain cover		0	0	0								
2012	T-1 F-7	19.7	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-7	19.7	Small grain cover		0	0	0								
2013	T-1 F-7	19.7	Corn silage	24	150	0	0	56	60	80	-94	60	80	-26	-119
2014	T-1 F-7	19.7	Small grain cover		0	0	0								
2014	T-1 F-7	19.7	Corn silage	24	150	0	0	48	24	75	-96†	84	155	-62	-124
2015	T-1 F-7	19.7	Small grain cover		0	0	0								
2015	T-1 F-7	19.7	Corn silage	24	150	0	0	56	60	80	-80†	144	235	-26	-119
2016	T-1 F-7	19.7	Small grain cover		0	0	0								
2016	T-1 F-7	19.7	Corn silage	24	150	0	0	56	60	80	-84†	204	315	-26	-119
Total	T-1 F-7				750	0	0	216	204	315					
2012	T-1 F-8	8.1	Small grain cover		0	0	0								
2012	T-1 F-8	8.1	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-8	8.1	Small grain cover		0	0	0								
2013	T-1 F-8	8.1	Corn silage	24	150	0	0	56	60	80	-94	60	80	-26	-119

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2014	T-1 F-8	8.1	Small grain cover		0	0	0								
2014	T-1 F-8	8.1	Corn silage	24	150	0	0	48	24	75	-96†	84	155	-62	-124
2015	T-1 F-8	8.1	Small grain cover		0	0	0								
2015	T-1 F-8	8.1	Corn silage	24	150	0	0	56	60	80	-80†	144	235	-26	-119
2016	T-1 F-8	8.1	Small grain cover		0	0	0								
2016	T-1 F-8	8.1	Corn silage	24	150	0	0	56	60	80	-84†	204	315	-26	-119
Total	T-1 F-8				750	0	0	216	204	315					
2012	T-1 F-10	4.3	Grass-clover hay maint	4	60	30	0	31	30	36	-29	0	36	-30	-204
2013	T-1 F-10	4.3	Grass-clover hay maint	4	60	30	0	48	46	54	-4†	16	90	-14	-186
2014	T-1 F-10	4.3	Grass-clover hay maint	4	60	30	0	47	46	53	2†	32	143	-14	-187
2015	T-1 F-10	4.3	Grass-clover hay maint	4	60	30	0	48	46	54	4†	48	197	-14	-186
2016	T-1 F-10	4.3	Grass-clover hay maint	4	60	30	0	48	46	54	4†	64	251	-14	-186
Total	T-1 F-10				300	150	0	222	214	251					
2012	T-1 F-13	11.6	Small grain cover		0	0	0								
2012	T-1 F-13	11.6	Corn silage	24	150	0	0	48	24	76	-102	24	76	-62	-123
2013	T-1 F-13	11.6	Small grain cover		0	0	0								
2013	T-1 F-13	11.6	Corn silage	24	150	0	0	56	60	80	-82†	84	156	-26	-119
2014	T-1 F-13	11.6	Small grain cover		0	0	0								
2014	T-1 F-13	11.6	Corn silage	24	150	0	0	124	105	184	-16†	189	340	19	-15
2015	T-1 F-13	11.6	Small grain cover		0	0	0								
2015	T-1 F-13	11.6	Corn silage	24	150	0	0	0	0	0	-128†	189	340	-67	-199
2016	T-1 F-13	11.6	Small grain cover		0	0	0								
2016	T-1 F-13	11.6	Corn silage	24	150	0	0	76	81	108	-67†	270	448	-5	-91
Total	T-1 F-13				750	0	0	304	270	448					
2012	T-1 F-14	4.7	Sm grain spring hay	5	105	0	0								
2012	T-1 F-14	4.7	Corn silage	25	150	0	0	48	24	75	-207	24	75	-101	-288
2013	T-1 F-14	4.7	Sm grain spring hay	5	105	0	0								
2013	T-1 F-14	4.7	Corn silage	25	150	0	0	48	24	75	-195†	48	150	-101	-288
2014	T-1 F-14	4.7	Sm grain spring hay	5	105	0	0								
2014	T-1 F-14	4.7	Corn silage	25	150	0	0	48	24	75	-191†	72	225	-101	-288

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2015	T-1 F-14	4.7	Sm grain spring hay	5	105	0	0								
2015	T-1 F-14	4.7	Corn silage	25	150	0	0	124	105	183	-115†	177	408	-20	-180
2016	T-1 F-14	4.7	Sm grain spring hay	5	105	0	0								
2016	T-1 F-14	4.7	Corn silage	25	150	0	0	104	84	155	-127†	261	563	-41	-208
Total	T-1 F-14				1275	0	0	372	261	563					
2012	T-1 F-15	22.6	Sm grain spring hay	5	105	0	0								
2012	T-1 F-15	22.6	Corn silage	25	150	0	0	48	24	75	-207	24	75	-101	-288
2013	T-1 F-15	22.6	Sm grain spring hay	5	105	0	0								
2013	T-1 F-15	22.6	Corn silage	25	150	0	0	48	24	75	-195†	48	150	-101	-288
2014	T-1 F-15	22.6	Sm grain spring hay	5	105	0	0								
2014	T-1 F-15	22.6	Corn silage	25	150	0	0	48	24	75	-191†	72	225	-101	-288
2015	T-1 F-15	22.6	Sm grain spring hay	5	105	0	0								
2015	T-1 F-15	22.6	Corn silage	25	150	0	0	48	24	75	-191†	96	300	-101	-288
2016	T-1 F-15	22.6	Sm grain spring hay	5	105	0	0								
2016	T-1 F-15	22.6	Corn silage	25	150	0	0	48	24	75	-191†	120	375	-101	-288
Total	T-1 F-15				1275	0	0	240	120	375					
2012	T-1 F-16	16.2	Small grain cover		0	0	0								
2012	T-1 F-16	16.2	Corn silage	24	150	0	0	48	24	75	-102	24	75	-62	-124
2013	T-1 F-16	16.2	Small grain cover		0	0	0								
2013	T-1 F-16	16.2	Corn silage	24	150	0	0	56	60	80	-82†	84	155	-26	-119
2014	T-1 F-16	16.2	Small grain cover		0	0	0								
2014	T-1 F-16	16.2	Corn silage	24	150	0	0	76	81	108	-64†	165	263	-5	-91
2015	T-1 F-16	16.2	Small grain cover		0	0	0								
2015	T-1 F-16	16.2	Corn silage	24	150	0	0	76	81	108	-64†	246	371	-5	-91
2016	T-1 F-16	16.2	Small grain cover		0	0	0								
2016	T-1 F-16	16.2	Corn silage	24	150	0	0	76	81	108	-63†	327	479	-5	-91
Total	T-1 F-16				750	0	0	332	327	479					
2012	T-1 F-27	31.8	Small grain cover		0	0	0								
2012	T-1 F-27	31.8	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-27	31.8	Small grain cover		0	0	0								

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2013	T-1 F-27	31.8	Corn silage	24	150	0	0	56	60	80	-94	60	80	-26	-119
2014	T-1 F-27	31.8	Small grain cover		0	0	0								
2014	T-1 F-27	31.8	Corn silage	24	150	0	0	56	60	80	-88†	120	160	-26	-119
2015	T-1 F-27	31.8	Small grain cover		0	0	0								
2015	T-1 F-27	31.8	Corn silage	24	150	0	0	48	24	75	-94†	144	235	-62	-124
2016	T-1 F-27	31.8	Small grain cover		0	0	0								
2016	T-1 F-27	31.8	Corn silage	24	150	0	0	56	60	80	-80†	204	315	-26	-119
Total	T-1 F-27				750	0	0	216	204	315					
2012	T-1 F-28	16.4	Small grain cover		0	0	0								
2012	T-1 F-28	16.4	Corn silage	24	150	0	0	48	24	75	-102	24	75	-62	-124
2013	T-1 F-28	16.4	Small grain cover		0	0	0								
2013	T-1 F-28	16.4	Corn silage	24	150	0	0	56	60	80	-82†	84	155	-26	-119
2014	T-1 F-28	16.4	Small grain cover		0	0	0								
2014	T-1 F-28	16.4	Corn silage	24	150	0	0	76	81	108	-64†	165	263	-5	-91
2015	T-1 F-28	16.4	Small grain cover		0	0	0								
2015	T-1 F-28	16.4	Corn silage	24	150	0	0	76	81	108	-64†	246	371	-5	-91
2016	T-1 F-28	16.4	Small grain cover		0	0	0								
2016	T-1 F-28	16.4	Corn silage	24	150	0	0	76	81	108	-63†	327	479	-5	-91
Total	T-1 F-28				750	0	0	332	327	479					
2012	T-1 F-33	17.2	Small grain cover		0	0	0								
2012	T-1 F-33	17.2	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-33	17.2	Small grain cover		0	0	0								
2013	T-1 F-33	17.2	Corn silage	24	150	0	0	56	60	80	-94	60	80	-26	-119
2014	T-1 F-33	17.2	Small grain cover		0	0	0								
2014	T-1 F-33	17.2	Corn silage	24	150	0	0	56	60	80	-88†	120	160	-26	-119
2015	T-1 F-33	17.2	Small grain cover		0	0	0								
2015	T-1 F-33	17.2	Corn silage	24	150	0	0	48	24	75	-94†	144	235	-62	-124
2016	T-1 F-33	17.2	Small grain cover		0	0	0								
2016	T-1 F-33	17.2	Corn silage	24	150	0	0	48	24	75	-88†	168	310	-62	-124
Total	T-1 F-33				750	0	0	208	168	310					

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2012	T-7059 F-2	19.2	Small grain cover		0	0	0								
2012	T-7059 F-2	19.2	Corn silage	24	150	0	0	32	16	50	-118	16	50	-70	-149
2013	T-7059 F-2	19.2	Small grain cover		0	0	0								
2013	T-7059 F-2	19.2	Corn silage	24	150	0	0	48	24	75	-94†	40	125	-62	-124
2014	T-7059 F-2	19.2	Small grain cover		0	0	0								
2014	T-7059 F-2	19.2	Corn silage	24	150	0	0	48	24	75	-87†	64	200	-62	-124
2015	T-7059 F-2	19.2	Small grain cover		0	0	0								
2015	T-7059 F-2	19.2	Corn silage	24	150	0	0	48	24	75	-86†	88	275	-62	-124
2016	T-7059 F-2	19.2	Small grain cover		0	0	0								
2016	T-7059 F-2	19.2	Corn silage	24	150	0	0	48	24	75	-86†	112	350	-62	-124
Total	T-7059 F-2				750	0	0	224	112	350					
2012	T-7059 F-3	28.6	Small grain cover		0	0	0								
2012	T-7059 F-3	28.6	Corn silage	24	150	0	160	48	24	75	-102	24	-85	-62	-124
2013	T-7059 F-3	28.6	Small grain cover		0	0	0								
2013	T-7059 F-3	28.6	Corn silage	24	150	0	160	48	24	75	-90†	48	-85	-62	-124
2014	T-7059 F-3	28.6	Small grain cover		0	0	0								
2014	T-7059 F-3	28.6	Corn silage	24	150	0	160	48	24	75	-86†	72	-85	-62	-124
2015	T-7059 F-3	28.6	Small grain cover		0	0	0								
2015	T-7059 F-3	28.6	Corn silage	24	150	0	160	48	24	75	-86†	96	-85	-62	-124
2016	T-7059 F-3	28.6	Small grain cover		0	0	0								
2016	T-7059 F-3	28.6	Corn silage	24	150	0	160	48	24	75	-86†	120	-85	-62	-124
Total	T-7059 F-3				750	0	800	240	120	375					
2012	T-7059 F-6	10.8	Small grain cover		0	0	0								
2012	T-7059 F-6	10.8	Corn silage	24	150	0	0	32	16	50	-118	16	50	-70	-149
2013	T-7059 F-6	10.8	Small grain cover		0	0	0								
2013	T-7059 F-6	10.8	Corn silage	24	150	0	0	48	24	75	-94†	40	125	-62	-124
2014	T-7059 F-6	10.8	Small grain cover		0	0	0								
2014	T-7059 F-6	10.8	Corn silage	24	150	0	0	48	24	75	-87†	64	200	-62	-124
2015	T-7059 F-6	10.8	Small grain cover		0	0	0								
2015	T-7059 F-6	10.8	Corn silage	24	150	0	0	48	24	75	-86†	88	275	-62	-124

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2016	T-7059 F-6	10.8	Small grain cover		0	0	0								
2016	T-7059 F-6	10.8	Corn silage	24	150	0	0	48	24	75	-86†	112	350	-62	-124
Total	T-7059 F-6				750	0	0	224	112	350					
2012	T-7179 F-1	7.8	Sm grain spring hay	5	105	0	0								
2012	T-7179 F-1	7.8	Corn silage	24	150	0	0	49	24	76	-206	24	76	-97	-278
2013	T-7179 F-1	7.8	Sm grain spring hay	5	105	0	0								
2013	T-7179 F-1	7.8	Corn silage	24	150	0	0	49	24	76	-194†	48	152	-97	-278
2014	T-7179 F-1	7.8	Sm grain spring hay	5	105	0	0								
2014	T-7179 F-1	7.8	Corn silage	24	150	0	0	49	24	76	-190†	72	228	-97	-278
2015	T-7179 F-1	7.8	Sm grain spring hay	5	105	0	0								
2015	T-7179 F-1	7.8	Corn silage	24	150	0	0	125	105	184	-114†	177	412	-16	-170
2016	T-7179 F-1	7.8	Sm grain spring hay	5	105	0	0								
2016	T-7179 F-1	7.8	Corn silage	24	150	0	0	105	84	156	-126†	261	568	-37	-198
Total	T-7179 F-1				1275	0	0	377	261	568					
2012	T-7179 F-2	6.0	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2013	T-7179 F-2	6.0	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2014	T-7179 F-2	6.0	Grass-clover hay maint	4	60	0	0	97	105	183	37	105	183	45	-57
2015	T-7179 F-2	6.0	Grass-clover hay maint	4	60	0	0	97	105	183	57†	210	366	90	-57
2016	T-7179 F-2	6.0	Grass-clover hay maint	4	60	0	0	97	105	183	64†	315	549	135	-57
Total	T-7179 F-2				300	0	0	291	315	549					

Field Nutrient Balance (Non-manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2012	T-1 F-6	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2013	T-1 F-6	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2014	T-1 F-6	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2015	T-1 F-6	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2016	T-1 F-6	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
Total	T-1 F-6				300	0	0	0	0	0					
2012	T-1 F-7	1.4	Small grain cover		0	0	0								
2012	T-1 F-7	1.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-7	1.4	Small grain cover		0	0	0								
2013	T-1 F-7	1.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2014	T-1 F-7	1.4	Small grain cover		0	0	0								
2014	T-1 F-7	1.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2015	T-1 F-7	1.4	Small grain cover		0	0	0								
2015	T-1 F-7	1.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2016	T-1 F-7	1.4	Small grain cover		0	0	0								
2016	T-1 F-7	1.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
Total	T-1 F-7				750	0	0	0	0	0					
2012	T-1 F-13	0.4	Small grain cover		0	0	0								
2012	T-1 F-13	0.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-13	0.4	Small grain cover		0	0	0								
2013	T-1 F-13	0.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2014	T-1 F-13	0.4	Small grain cover		0	0	0								
2014	T-1 F-13	0.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2015	T-1 F-13	0.4	Small grain cover		0	0	0								
2015	T-1 F-13	0.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2016	T-1 F-13	0.4	Small grain cover		0	0	0								
2016	T-1 F-13	0.4	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
Total	T-1 F-13				750	0	0	0	0	0					
2012	T-1 F-14	1.3	Sm grain spring hay	5	105	0	0								

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2012	T-1 F-14	1.3	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
2013	T-1 F-14	1.3	Sm grain spring hay	5	105	0	0								
2013	T-1 F-14	1.3	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
2014	T-1 F-14	1.3	Sm grain spring hay	5	105	0	0								
2014	T-1 F-14	1.3	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
2015	T-1 F-14	1.3	Sm grain spring hay	5	105	0	0								
2015	T-1 F-14	1.3	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
2016	T-1 F-14	1.3	Sm grain spring hay	5	105	0	0								
2016	T-1 F-14	1.3	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
Total	T-1 F-14				1275	0	0	0	0	0					
2012	T-1 F-15	0.6	Sm grain spring hay	5	105	0	0								
2012	T-1 F-15	0.6	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
2013	T-1 F-15	0.6	Sm grain spring hay	5	105	0	0								
2013	T-1 F-15	0.6	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
2014	T-1 F-15	0.6	Sm grain spring hay	5	105	0	0								
2014	T-1 F-15	0.6	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
2015	T-1 F-15	0.6	Sm grain spring hay	5	105	0	0								
2015	T-1 F-15	0.6	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
2016	T-1 F-15	0.6	Sm grain spring hay	5	105	0	0								
2016	T-1 F-15	0.6	Corn silage	25	150	0	0	0	0	0	-255	0	0	-125	-363
Total	T-1 F-15				1275	0	0	0	0	0					
2012	T-1 F-16	2.6	Small grain cover		0	0	0								
2012	T-1 F-16	2.6	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-16	2.6	Small grain cover		0	0	0								
2013	T-1 F-16	2.6	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2014	T-1 F-16	2.6	Small grain cover		0	0	0								
2014	T-1 F-16	2.6	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2015	T-1 F-16	2.6	Small grain cover		0	0	0								
2015	T-1 F-16	2.6	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2016	T-1 F-16	2.6	Small grain cover		0	0	0								

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2016	T-1 F-16	2.6	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
Total	T-1 F-16				750	0	0	0	0	0					
2012	T-1 F-27	0.9	Small grain cover		0	0	0								
2012	T-1 F-27	0.9	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-27	0.9	Small grain cover		0	0	0								
2013	T-1 F-27	0.9	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2014	T-1 F-27	0.9	Small grain cover		0	0	0								
2014	T-1 F-27	0.9	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2015	T-1 F-27	0.9	Small grain cover		0	0	0								
2015	T-1 F-27	0.9	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2016	T-1 F-27	0.9	Small grain cover		0	0	0								
2016	T-1 F-27	0.9	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
Total	T-1 F-27				750	0	0	0	0	0					
2012	T-1 F-33	1.1	Small grain cover		0	0	0								
2012	T-1 F-33	1.1	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-1 F-33	1.1	Small grain cover		0	0	0								
2013	T-1 F-33	1.1	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2014	T-1 F-33	1.1	Small grain cover		0	0	0								
2014	T-1 F-33	1.1	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2015	T-1 F-33	1.1	Small grain cover		0	0	0								
2015	T-1 F-33	1.1	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2016	T-1 F-33	1.1	Small grain cover		0	0	0								
2016	T-1 F-33	1.1	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
Total	T-1 F-33				750	0	0	0	0	0					
2012	T-7059 F-3	0.9	Small grain cover		0	0	0								
2012	T-7059 F-3	0.9	Corn silage	24	150	0	160	0	0	0	-150	0	-160	-86	-199
2013	T-7059 F-3	0.9	Small grain cover		0	0	0								
2013	T-7059 F-3	0.9	Corn silage	24	150	0	160	0	0	0	-150	0	-160	-86	-199
2014	T-7059 F-3	0.9	Small grain cover		0	0	0								
2014	T-7059 F-3	0.9	Corn silage	24	150	0	160	0	0	0	-150	0	-160	-86	-199

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2015	T-7059 F-3	0.9	Small grain cover		0	0	0								
2015	T-7059 F-3	0.9	Corn silage	24	150	0	160	0	0	0	-150	0	-160	-86	-199
2016	T-7059 F-3	0.9	Small grain cover		0	0	0								
2016	T-7059 F-3	0.9	Corn silage	24	150	0	160	0	0	0	-150	0	-160	-86	-199
Total	T-7059 F-3				750	0	800	0	0	0					
2012	T-7059 F-6	0.8	Small grain cover		0	0	0								
2012	T-7059 F-6	0.8	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2013	T-7059 F-6	0.8	Small grain cover		0	0	0								
2013	T-7059 F-6	0.8	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2014	T-7059 F-6	0.8	Small grain cover		0	0	0								
2014	T-7059 F-6	0.8	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2015	T-7059 F-6	0.8	Small grain cover		0	0	0								
2015	T-7059 F-6	0.8	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
2016	T-7059 F-6	0.8	Small grain cover		0	0	0								
2016	T-7059 F-6	0.8	Corn silage	24	150	0	0	0	0	0	-150	0	0	-86	-199
Total	T-7059 F-6				750	0	0	0	0	0					
2012	T-7179 F-1	1.0	Sm grain spring hay	5	105	0	0								
2012	T-7179 F-1	1.0	Corn silage	24	150	0	0	0	0	0	-255	0	0	-121	-354
2013	T-7179 F-1	1.0	Sm grain spring hay	5	105	0	0								
2013	T-7179 F-1	1.0	Corn silage	24	150	0	0	0	0	0	-255	0	0	-121	-354
2014	T-7179 F-1	1.0	Sm grain spring hay	5	105	0	0								
2014	T-7179 F-1	1.0	Corn silage	24	150	0	0	0	0	0	-255	0	0	-121	-354
2015	T-7179 F-1	1.0	Sm grain spring hay	5	105	0	0								
2015	T-7179 F-1	1.0	Corn silage	24	150	0	0	0	0	0	-255	0	0	-121	-354
2016	T-7179 F-1	1.0	Sm grain spring hay	5	105	0	0								
2016	T-7179 F-1	1.0	Corn silage	24	150	0	0	0	0	0	-255	0	0	-121	-354
Total	T-7179 F-1				1275	0	0	0	0	0					
2012	T-7179 F-2	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2013	T-7179 F-2	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2014	T-7179 F-2	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2015	T-7179 F-2	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
2016	T-7179 F-2	0.5	Grass-clover hay maint	4	60	0	0	0	0	0	-60	0	0	-60	-240
Total	T-7179 F-2				300	0	0	0	0	0					

¹ Fertilizer Recs are the crop fertilizer recommendations. The N rec accounts for any N credit from previous legume crop.

² Nutrients Applied are the nutrients expected to be available to the crop from that year's manure applications plus nutrients from that year's commercial fertilizer applications and nitrates from irrigation water. With a double-crop year, the total nutrients applied for both crops and the year's balances are listed on the second crop's line.

³ For N, Nutrients Applied minus Fertilizer Recs for indicated crop year. Also includes amount of residual N expected to become available that year from prior years' manure applications. For P₂O₅ and K₂O, Nutrients Applied minus Fertilizer Recs *through* the indicated crop year, with positive balances carried forward to subsequent years. Negative values indicate a potential need to apply additional nutrients.

⁴ Nutrients Applied minus amount removed by harvested portion of crop through the indicated year. Positive balances are carried forward to subsequent years.

▣ Indicates a custom fertilizer recommendation in the Fertilizer Recs column.

^a Indicates in the Balance After Recs N column that the legume crop is assumed to utilize some or all of the supplied N.

[†] Indicates in the Balance After Recs N column that the value includes residual N expected to become available that year from prior years' manure applications.

6.9. Manure Inventory Annual Summary

Manure Source	Plan Period	On Hand at Start of Period	Total Generated	Total Imported	Total Transferred In	Total Applied	Total Exported	Total Transferred Out	On Hand at End of Period	Units
Storage Pond	Oct '11 - Sep '12	500,000	2,750,000	0	0	2,420,000	0	0	830,000	Gal
Manure pit	Oct '11 - Sep '12	300	4,150	0	0	2,802	1,550	0	98	Ton
Calf barns	Oct '11 - Sep '12	15	85	0	0	56	0	0	44	Ton
All Sources (liquid)	Oct '11 - Sep '12	500,000	2,750,000	0	0	2,420,000	0	0	830,000	Gal
All Sources (solid)	Oct '11 - Sep '12	315	4,235	0	0	2,858	1,550	0	142	Ton
Storage Pond	Oct '12 - Sep '13	830,000	2,750,000	0	0	2,540,600	0	0	1,039,400	Gal
Manure pit	Oct '12 - Sep '13	98	4,150	0	0	528	3,000	0	720	Ton
Calf barns	Oct '12 - Sep '13	44	85	0	0	86	0	0	43	Ton
All Sources (liquid)	Oct '12 - Sep '13	830,000	2,750,000	0	0	2,540,600	0	0	1,039,400	Gal
All Sources (solid)	Oct '12 - Sep '13	142	4,235	0	0	614	3,000	0	763	Ton
Storage Pond	Oct '13 - Sep '14	1,039,400	2,750,000	0	0	2,213,800	0	0	1,575,600	Gal
Manure pit	Oct '13 - Sep '14	720	4,150	0	0	2,091	2,050	0	729	Ton
Calf barns	Oct '13 - Sep '14	43	85	0	0	85	0	0	43	Ton
All Sources (liquid)	Oct '13 - Sep '14	1,039,400	2,750,000	0	0	2,213,800	0	0	1,575,600	Gal
All Sources (solid)	Oct '13 - Sep '14	763	4,235	0	0	2,176	2,050	0	772	Ton
Storage Pond	Oct '14 - Sep '15	1,575,600	2,750,000	0	0	3,075,500	0	0	1,250,100	Gal
Manure pit	Oct '14 - Sep '15	729	4,150	0	0	2,234	1,950	0	695	Ton
Calf barns	Oct '14 - Sep '15	43	85	0	0	86	0	0	42	Ton
All Sources (liquid)	Oct '14 - Sep '15	1,575,600	2,750,000	0	0	3,075,500	0	0	1,250,100	Gal
All Sources (solid)	Oct '14 - Sep '15	772	4,235	0	0	2,320	1,950	0	737	Ton
Storage Pond	Oct '15 - Sep '16	1,250,100	2,750,000	0	0	2,213,800	0	0	1,786,300	Gal
Manure pit	Oct '15 - Sep '16	695	4,150	0	0	1,757	2,800	0	288	Ton
Calf barns	Oct '15 - Sep '16	42	85	0	0	86	0	0	40	Ton
All Sources (liquid)	Oct '15 - Sep '16	1,250,100	2,750,000	0	0	2,213,800	0	0	1,786,300	Gal
All Sources (solid)	Oct '15 - Sep '16	737	4,235	0	0	1,843	2,800	0	328	Ton

6.10. Fertilizer Material Annual Summary

Product Analysis	Plan Period	Product Needed Oct - Dec	Product Needed Jan - Sep	Total Product Needed	Units
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6.11. Whole-farm Nutrient Balance (Manure-spreadable Area)

	N (Lbs)	P ₂ O ₅ (Lbs)	K ₂ O (Lbs)
Total Manure Nutrients on Hand at Start of Plan ¹	4,520	2,014	3,540
Total Manure Nutrients Collected ²	225,625	75,428	159,898
Total Manure Nutrients Imported ³	0	0	0
Total Manure Nutrients Exported ⁴	91,935	18,160	56,750
Total Manure Nutrients on Hand at End of Plan ⁵	9,719	5,912	8,694
Total Manure Nutrients Applied ⁶	128,818	53,374	98,013
Available Manure Nutrients Applied ⁷	75,044	53,374	98,013
Commercial Fertilizer Nutrients Applied ⁸	0	0	0
Available Nutrients Applied ⁹	75,044	53,374	98,013
Nutrient Utilization Potential ¹⁰	200,052	105,190	266,778
Nutrient Balance of Spreadable Acres ^{11*}	-125,008	-51,816	-168,765
Average Nutrient Balance per Spreadable Acre per Year ^{12*}	-106	-44	-143

1. Values indicate total manure nutrients present in storage(s) at the beginning of the plan.

2. Values indicate total manure nutrients collected on the farm.

3. Values indicate total manure nutrients imported onto the farm.

4. Values indicate total manure nutrients exported from the farm to an external operation.

5. Values indicate total manure nutrients present in storage(s) at the end of plan.

6. Values indicate total nutrients present in land-applied manure. Losses due to rate, timing and method of application are not included in these values.

7. Values indicate available manure nutrients applied on the farm based on rate, time and method of application. These values are based on the total manure nutrients applied (row 6) after accounting for state-specific nutrient losses due to rate, time and method of application.

8. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water.

9. Values are the sum of available manure nutrients applied (row 7) and commercial fertilizer nutrients applied (row 8).

10. Values indicate nutrient utilization potential of crops grown. For N the value generally is based on crop N recommendation for non-legume crops and crop N uptake or other state-imposed limit for N application rates for legumes. P₂O₅ and K₂O values generally are based on fertilizer recommendations or crop removal (whichever is greatest).

11. Values indicate available nutrients applied (row 9) minus crop nutrient utilization potential (row 10). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

12. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of spreadable acres (row 11) by the number of spreadable acres in plan and by the length of the plan in years. Negative values indicate additional average per acre nutrient utilization potential and positive values indicate average per acre over-application.

Whole-farm Nutrient Balance (Non-manure-spreadable Area)

	N (Lbs)	P ₂ O ₅ (Lbs)	K ₂ O (Lbs)
Commercial Fertilizer Nutrients Applied ¹	0	0	0
Nutrient Utilization Potential ²	10,072	0	720
Nutrient Balance of Non-spreadable Acres ^{3*}	-10,072	0	-720
Average Nutrient Balance per Non-spreadable Acre per Year ^{4*}	-168	0	-12

1. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water.

2. Values indicate nutrient utilization potential of crops grown based on crop fertilizer recommendations.

3. Values indicate commercial fertilizer nutrients applied (row 1) minus crop nutrient utilization potential (row 2). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

4. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of non-spreadable acres (row 3) by number of non-spreadable acres in plan. Negative values indicate additional average per acre nutrient utilization potential and positive values indicate average per acre over-application.

Section 7. Feed Management

Section 8. Other Utilization Options

No alternative utilization options are in used at this time.

The practice of composting manure could be implemented in the future, with possible sales of compost as additional revenue to the farm.

Benefits of composting include:

- Composted material is an odorless, fine-textured, low-moisture material.
- Compost can be an excellent source of organic matter, nitrogen and other nutrients.
- Nitrogen in compost is stabilized and not as easily available to the crop as nitrogen from the raw material.
- Availability of phosphorus, potassium, and micronutrients from compost should be similar or higher than manure or other organic residues used for composting.
- Since compost is fine textured and has less water than the raw material, it can be applied more uniformly and with better control.
- The composted material also can be stored and applied when convenient.
- Weed seeds or pathogens that can create problems with application of manure or other organic residues should not be a concern when properly made compost is used.

Section 9. Record Keeping Forms Annual Reports 2012-2016

Section 10. References

10.1. Publications

Crop Fertilizer Recommendations

"Lime and Fertilizer Recommendations for the Various Crops of Tennessee," BEES Info #100, Aug 2008
<http://soilplantandpest.utk.edu/publications/soilfertilizerpubs.htm>

Manure Application Setback Features/Distances

Nutrient Management Standard 590
[http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_\(590\)_Standard.doc](http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

TN DEQ Rule 1200-4-5-.14(17)(d)
<http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf>

TN DEQ Rule 1200-4-5-.14(17)(d)
<http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf>

Manure Nutrient Availability

"Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94
http://wastemgmt.ag.utk.edu/ExtensionProjects/extension_publications.htm

Phosphorus Assessment

"Tennessee Phosphorus Index," Tennessee NRCS, Nov. 2001

Practice Standards

Tennessee NRCS Nutrient Management Standard (590), Jan. 2003
[http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_\(590\)_Standard.doc](http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

10.2. Software and Data Sources

MMP Version	MMP 0.2.9.0
MMP Plan File	WillwayDairy-NMP1.mmp 1/8/2012 2:09:06 PM
MMP Initialization File for Tennessee	6/4/2009
MMP Soils File for Tennessee	11/17/2009
Phosphorus Assessment Tool	2009.02.20
NRCS Conservation Plan(s)	n/a
RUSLE2 Library	Version: 1.32.3.0 Build: Dec 17 2007 Science: 20061020
RUSLE2 Database	moses-IL.gdb